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Volume II

Part III Appendixes

February 1975

Tug Fleet and Ground Operations Schedules and Controls

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Volume II

Part III Appendixes

February 1975

TUG FLEET AND GROUND OPERATIONS SCHEDULES AND CONTROLS

MARTIN MARIETTA CORPORATION P. O. Box 179 Denver, Colorado 80201 This final report, submitted in accordance with Data Procurement Document number 480 dated June 1974, contract NASS-31011, is published in three volumes:

Volume I - Executive Summary (DRL MA-04)

Volume II - Part I Final Report (DRL MA-03)

Part II Addenda (DRL MA-03)

Part III Appendixes (DRL MA-03)

Volume III - Program Study Cost Estimates (DRL MF003M)

The content of each volume is shown in the diagram on the following page.

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A Tug Function Description Data Sheet is prepared for each block of the Space Tug Functional Flow Diagram. This sheet is a summary of basic information regarding the activities performed in its respective functional block. These sheets are catalogued by functional flow block numbers with the reference blocks at the end, and contain the following information:

FUNCTION NO: The number for the block on the Space Tug Functional Flow Diagram.

FUNCTION TITLE: The title of the function block.

FUNCTION OBJECTIVE: Brief statement as to objective of the particular functional flow block.

SITE LOCATION: The launch site where the function is performed, i.e., EIR or WTR, or both.

TIME TO COMPLETE (HRS): Estimate of the time required to complete the particular function. Maximum time implies that time required early in the program when processing the Engineering Model or First Flight Article, minimum time is that time required by experienced personnel later in the Shuttle program.

HAZARDOUS: An indication of whether the particular operation is categorized as hazardous. An explanation of any hazardous operation is explained under the "REMARKS" section of the data sheet.

AREA LOCATION: Identification of the building, facility, or area where the activities required by the function will be performed, i.e., Orbiter Landing Field (OLF), Orbiter Processing Facility (OPF), Tug Processing Facility (TPF), Spacecraft Processing Facility (SPF), Payload Changeout Room (PCR), Orbiter (ORB) or any other location noted.

^{*}Sharm in subplan A, Volume II, Part I.

PERSONNEL (HEAD COUNT): An estimate of the number of personnel and skills required to complete the requirements of the particular function. A number followed by an asterisk (*) indicates the personnel required to perform the function on the Engineering Model when different from the operational number. A number followed by two asterisks (**) indicates the personnel required to perform the function on the First Flight Article when different from the operational number. The numbers without asterisks are the number of personnel required to perform the function in the operational phase of the Tug program. GROUND SUPPORT EQUIPMENT: Identification of the GSE required to complete the function. GSE are identified by a unit identification number which corresponds to a specific piece of GSE further identified and defined on a Tug GSE Requirements Specification Data Sheet. TUG INTERFACE: Identifies any Tug interfaces, i.e., Orbiter, Spacecraft, facility, or software that are necessary to accomplish the function.

TUG ORIENTATION: Describes the physical orientation of the Tug, i.e., vertical or horizontal, during the accomplishment of the function.

PROCEDURES: Tug turnaround activities will be accomplished through the use of checklists rather than traditional lengthy procedures used for one on few-of-a-kind launches. This is as estimate of the number of technical pages contained in the checklist, the manhours to prepare these pages, an estimate of the number of changes made, and the manhours to incorporate these changes.

SOFTWARE REQUIREMENTS: Identification of checkout software necessary to complete requirements of the particular functional block, i.e., LPS program, Orbiter on-board computer program, Tug on-board computer program, ground control station program.

OPERATIONS: A brief descriptive synopsis of the activities performed to accomplish the function.

REMARKS: Comments regarding safety, operational constraints, prerequisites, or other pertinent information about the function.

COMMODITIES/CONSUMABLES REQUIRED: Identifies the type and amount

(pressure, flow rate, etc.) of commodities (helium, nitrogen, power,

etc.) required to support the accomplishment of the function.

FUNCTION NO: FUNCTION TITLE:		•		
1.1	Remove Payload and Install		on Transportation Dolly	у
FUNCTION OBJECTIV	E:			
Install	Payload on T	ransporter		
DITE LOCATION				
SITE LOCATION ETR	TIME TO COMP	MIN3	HAZARDOUS YES* NO	
WTRE				
AREA LOCATION OLF		WER6	GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY)	
OPF 🖄	TEST CONDUCTEST ENGINEE	TOR	н-018, н-024, н-025,	
TPF [] SPF []	PROPULSION T	ECH		
PCR □ ORB □	AVIONICS TEC	H		
	QUAL CONT, TI	ECH		
	TECHNICAL SU	PPORT	PROCEDURES	NEW CHANCE
TUG INTERFACE:		TUG ORIENTATION:	PAGES	NEW CHANGE
ORBITER SIF SPACECRAFT □ S	ACILITY [] OFTWARE []	HORIZONTAL 223 VERTICAL 口	MANHOURS	
SOFTWARE REQUIRE	_			
LPS ORB ON-BOARD CO				
TUG ON BOARD CO GROUND CONTROL OTHER				
OPERATIONS:				
Monitor P	/L Bay for t	oxic vapors and pro	oper oxygen content befo	ore entry.
			release Orbiter attachm oad onto transporter and	
		ng sling. Inspect r if equipped.	payload for any hazardo	us conditions.
NUMB V C III	rent recorde	r ir edarbhea.		
REMARKS:			**************************************	
COMMODITIES/CONSU	MABLES REQUII	RED: N/A		

FUNCTION NO:	FUNCTION TITLE:	•			
1.2	Remove Spacecraft				
FUNCTION OBJECTIVE		· · · · · · · · · · · · · · · · · · ·			
Demate Spac	ecraft and Tug				
	-				
SITE LOCATION	TIME TO COMPLETE (HRS)	HAZARDOUS			
1 - 1	MAX 6 MIN 3	YESXNO			
AREA LOCATION	PERSONNEL (HEADCOUNT)	GROUND SUPPORT EQUIPMENT			
OLF []	TOTAL MANPOWER5TEST CONDUCTOR	LPS @ OTHER & (SPECIFY)			
IOPF石) :	TEST ENGINEERS 1	н-019, н-026			
TPF □ SPF □	PROPULSION TECH	A-001			
	WECH/SINO/IN IECH				
ORB 🗆	AVIONICS TECH SAFETY ENGINEER1				
	QUAL CONT. TECH				
	TECHNICAL SUPPORT	PROCEDURES NEW CHANGE			
	THE OPERATATION.				
TUG INTERFACE:	TUG ORIENTATION: ACILITY HORIZONTAL Q	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
SPACECRAFT S		MANHOURS			
SOFTWARE REQUIREM	NENTS: N/A				
LPS					
ORB ON-BOARD COI					
GROUND CONTROL	STATION [
OTHER					
OPERATIONS:					
Position w	orkstands around S/C and attac	h S/C handling equipment.			
	ly demate S/C and Tug. Hoist ansportation cover over Tug.	and move 5/C away from fug.			
Install Cr	ansportation cover over 145.				
REMARKS:					
Spa	cecraft recovery mission only				
	7 %				
0014100157777700177	MADI EG DEGUIDED				
COMMODITIES/CONSU	MABLES REQUIRED: N/A				

PONCTION NO:	UNCTION NO: FUNCTION TITLE:				
1.3 Remove COMSEC Equi		ipment			
FUNCTION OBJECTIVE:					
	Remove o	classified LRU's			
1 · F		LETE (HRS)	HAZARDOUS		
ETR & ! M	AX <u>2</u>	MIN	YES NO X		
AREA LOCATION PI	ERSONNEL (H	EADCOUNT)	GROUND SUPPORT EQUIPMENT	سند تطلقات	
	OTAL MANPO EST CONDUCT	WER 2	LPS OTHER ED (SPECIFY)		
	EST ENGINEE	RS1	Н-026		
SPF 🗆 M	ROPULSION T ECH/STRU/TH	ECH			
I A	VIONICS TECH	H			
1 10		IEER ECH			
		PPORT			
			PROCEDURES NEW CHA	NGE	
TUG INTERFACE: ORBITER	CILITY []	TUG ORIENTATION: HORIZONTAL	PAGES42		
SPACECRAFT SOF		VERTICAL	MANHOURS 24 6		
SOFTWARE REQUIREME					
LPS ORB ON-BOARD COMP TUG ON-BOARD COMP GROUND CONTROL S' OTHER	· 📋		·		
OPERATIONS:					
			or and remove COMSEC LRU. Deliver		
LRU's to DOI	security.	,			
55114 0163					
REMARKS:					
Secure DOD m	nissions on	aly, requires secur	red area for removal.		
COMMODITIES/CONSUMA	ABLES REQUI	RED: N/A			

FUNCTION NO: FUNCTION TITLE:		TLE:			
1.4 Move		o Tug Processing F	acility Airlock		
FUNCTION OBJECTIV	FUNCTION OBJECTIVE:				
Transport	Tug to Tug P	rocessing Facility	(TPF)		
SITE LOCATION	TIME TO COMPL		HAZARDOUŞ		
ETR 🖾 WTR:(2)	MAX <u>6</u>	MIN4	YES NO		
AREA LOCATION	PERSONNEL (H	EADCOUNT) WER2	GROUND SUPPORT EQUIPMENT		
OLF □	TEST CONDUCT	OR	LPS (C) OTHER 图 (SPECIFY)		
OPF TPF	TEST ENGINEES	RS1 ECH	Prime Mover, H-001		
SPF □ PCR □	MECH/STRU/TH	I TECH	H-024		
ORS 🗆	AVIONICS TECH SAFETY ENGIN	EER 1			
Transport	QUAL CONT. TE	ECHPPORT			
	TECHNICAL SO	PPORT	PROCEDURES NEW CHANGE		
TUG INTERFACE:		TUG ORIENTATION:	PAGES 6 3		
ORBITER D F SPACECRAFT D S	ACILITY D	HORIZONTAL ☎ VERTICAL □	MANHOURS 36 9		
SOFTWARE REQUIRE		VENTIONE _			
LPS ORB ON-BOARD CO	MP 🗆				
TUG ON-BOARD CO	MP 🗀				
GROUND CONTROL OTHER	STATION []		•		
OPERATIONS:					
Artes De f	M t (M			
Remove Tra	me Mover to : nsportation (rransporter and mov Cover, visually ver	ve from OPF to TPF airlock area.		
Attach han	dling GSE and	i rotate Tug to ver	tical. Position Tug in Tug		
Workstand	and remove a	ccess panels.	,		
REMARKS:	<u> </u>	-			
	due to tran	sportation.			
		-			
COMMODITIES/CONSU	MABLES REQUIF	RED: NT/A			
CONMIDDITIES/CONSOMABLES REQUIRED: N/A					

1.4A Move to TFF C/O Cell FUNCTION OBJECTIVE: Transport Tug to TPF and install in checkout cell				
ł ·				
SITE LOCATION TIME TO COMPLETE (HRS) HAZARDOUS	HAZARDOUS			
ETR 🕅 MAX MIN4 YESX NO	YES NO			
AREA LOCATION PERSONNEL (HEADCOUNT) OLF	FY)			
TECHNICAL SUPPORT				
	NEW CHANGE 63			
SOFTWARE REQUIREMENTS: LPS				
REMARKS:				
Hazardous due to transportation and hoisting Factory clean processing				
COMMODITIES/CONSUMABLES REQUIRED:				
Cleaning chemicals				

,是是一个人,也是一个人的人,也是一个人的人,也是一个人的人,也是一个人的人,也是一个人的人,也是一个人的人,也是一个人的人,也是一个人的人,也是一个人的人,也是 第二章

FUNCTION NO:	FUNCTION TITLE:				
1.5	Safe and Remove Un	expended Ordnance			
FUNCTION OBJECTIVE	FUNCTION OBJECTIVE:				
Remove un	expended and expended ordnance	items			
SITE LOCATION	TIME TO COMPLETE (HRS)	HAZARDOUS			
ETR 52 WTR 53	MAX 4 MIN 2	YES X NO NO			
AREA LOCATION PERSONNEL (HEADCOUNT) OLF [] TOTAL MANPOWER 5 OPF [] TEST CONDUCTOR TEST ENGINEERS 1 TPF £] PROPULSION TECH 2 SPF [] MECH/STRU/TH TECH. PCR [] AVIONICS TECH 1 ORB [] SAFETY ENGINEER 1 QUAL CONT. TECH TECHNICAL SUPPORT		GROUND SUPPORT EQUIPMENT LPS 图 OTHER 忆 (SPECIFY) As required,			
		PROCEDURES NEW CHANGE			
TUG INTERFACE: ORBITER	TUG ORIENTATION: ACILITY HORIZONTAL	PAGES			
SPACECRAFT S	· · · · · · · · · · · · · · · · · · ·	MANHOURS72 18			
SOFTWARE REQUIREM LPS ORB ON-BOARD COM TUG ON-BOARD COM GROUND CONTROL OTHER OPERATIONS:	MP [] MP []				
Safe ordnan ordnance.	ce mechanically, inspect ordnar Remove expended ordnance and ca	nce, remove unexpended igniters/ ap leads.			
REMARKS:					
Use LPS to	electrically safe ordnance. nly if Tug requires ordnance.				
COMMODITIES/CONSUM	MABLES REQUIRED: N/A				

FUNCTION NO:	FUNCTION TITLE:				
1.6	Drain and Purge APS				
FUNCTION OBJECTIVE	:				
	Remove all liquid from APS				
I I	TIME TO COMPLETE (HRS)	HAZARDOUS			
ETR ®	MAX _ 6 MIN3	YESXNO			
OLF -	PERSONNEL (HEADCOUNT) TOTAL MANPOWER5 TEST CONDUCTOR TEST ENGINEERS1	GROUND SUPPORT EQUIPMENT LPS M OTHER M (SPECIFY) P-011, P-016, A-001, A-008			
SPF 🗆	PROPULSION TECH MECH/STRU/TH TECH				
ORB L)	AVIONICS TECHSAFETY ENGINEER1 QUAL CONT. TECH1 TECHNICAL SUPPORT				
		PROCEDURES NEW CHANGE			
	TUG INTERFACE: TUG ORIENTATION: PAGES 4 3				
SOFTWARE REQUIREM LPS ORB ON,BOARD COM TUG ON-BOARD COM GROUND CONTROL! OTHER	AP () AP ()	,			
OPERATIONS:					
Tug pres fluid si	APS servicing unit, remove prossure system. Drain all lines ide of tank to 3 ± 1 psig and condition	Pressurize fluid lines and cap system.			
DEM - DICC					
Requir	REMARKS: Requires protective clothing during propellant unloading				
COMMODITIES/CONSUN	MABLES REQUIRED: GSE power				

FUNCTION NO	FUNCTION TI	TLE:			
1.7	Remove Flight		Batteries		
FUNCTION OBJECTIVE:		,			
Remove	Flight Bat	teries for Refurbi	shment		
	g				
	IME TO COMPI	LETE (HRS) MIN1	HAZARDOUŞ YESNOX		
W.I.R.					
	PERSONNEL (H FOTAL MANPO	WER4	GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY)		
OLF 🗆	TEST CONDUCT	ror Rs1			
TPF 😡	PROPULSION T	ECH	<u> H-021</u>		
PCR □	AVIONICS TECH	HTECH2			
	SAFETY ENGIN QUAL CONT. TE	EERECH			
		PPORT			
TUG INTERFACE:		TUG ORIENTATION:	PROCEDURES NEW CHANGE PAGES 4 2		
	CILITY	HORIZONTAL ☐ VERTICAL ᡚ	MANHOURS 24 6		
SOFTWARE REQUIREM		<u> </u>			
LPS ORB ON-BOARD COM	fP 🗆				
TUG ON-BOARD CON GROUND CONTROL	1P 🗍				
OTHER			-		
OPERATIONS:					
Disconn	ect flight	battery from Tug p	ower system, release hold down		
and rem	ove battery	•			
REMARKS:					
<u> </u>					
COMMODITIES/CONSUM	MABLES REQU	IRED: N/A			
			•		

FUNCTION NO:	FUNCTION T	ITLE:		1	
1.8 Connect LH ₂ Ground Vent &		Dump Lines			
FUNCTION OBJECTIVE:					
Prepare Tu _i	g for dump a	nd vent of LH ₂			
SITE LOCATION ETR ② WTR ③		MIN5	HAZARDOUS YES, X	NO	
AREA LOCATION PERSONNEL (HEADCOUNT) TOTAL MANPOWER 3 TEST CONDUCTOR TEST ENGINEERS 1 TPF PROPULSION TECH SPF MECH/STRU/TH TECH 1 PCR AVIONICS TECH ORB SAFETY ENGINEER 1		GROUND SUPPOR			
		ECHPPORT			
			PROCEDURES	NEW	CHANGE
	ORBITER DE FACILITY HORIZONTAL A			PAGES	
SPACECRAFT SOFTWARE VERTICAL MANHOURS SOFTWARE REQUIREMENTS: LPS ORB ON-BOARD COMP GROUND COMP GROUND CONTROL STATION OTHER OPERATIONS: Spot Aft Umbilical Servicing Unit near Tug and extend boom. Mate interface plate with Orbiter T-O Umbilical Plate.					
REMARKS: Orbiter procedure. Hazardous because of propellant in bay.					
COMMODITIES/CONSU	MABLES REQUI	RED:			

FUNCTION NO:	FUNCTION TITLE:				
1.9	1.9 Boil-off and Burn LH ₂				
FUNCTION OBJECTIVE	<u>:</u>				
Remove LH ₂	from Tug Ta	nk			
-					
1 1	TIME TO COMPI	LETE (HRS) MIN <u>4</u>	HAZARDOUS YES X NO NO		
WTR (X)	·				
1	PERSONNEL (H	WER3	GROUND SUPPORT EQUIPMENT LPS □ OTHER ☼ (SPECIFY)		
OLF CX	TEST CONDUCT	TOR	•		
TPF 🗆	PROPULSION T	RS1 ECH1	P-001		
SPF CI PCR CI	MECH/STRU/TH	1 TECH			
ORB 🗆	AVIONICS TEC SAFETY ENGIN	H			
	QUAL CONT. TE	ECH			
	TECHNICAL SU	PPORT			
THE INTERESE	, The state of the	TUG ORIENTATION:	PROCEDURES NEW		
TUG INTERFACE:	FACILITY HORIZONTAL		PAGES		
SPACECRAFT D S		VERTICAL	MANHOURS		
SOFTWARE REQUIREM					
ORB ON-BOARD COL TUG ON-BOARD COL GROUND CONTROL OTHER	MP 🗍				
through bur		Aft Umbilical Serv	ell LH, to boil off and vent icing Unit. Monitor Tug		
REMARKS: Orbiter pro	oceduro				
		ropellant in bay.			
COMMODITIES/CONSU	MABLES REQUI	RED:			

FUNCTION NO:	FUNCTION TITLE:		
1.10	Purge LO ₂ Tanks and Lines		
FUNCTION OBJECTIV	E:		
Verify no	liquid remains in LO ₂ tank.		
	-		
SITE LOCATION	TIME TO COMPLETE (HRS)	HAZARDOUS	
ETR IX WTR IX	MAX4 MIN2	YES, X NO	
AREA LOCATION	PERSONNEL (HEADCOUNT)	GROUND SUPPORT EQUIPMENT	
OLF 👸	TOTAL MANPOWER 3 TEST CONDUCTOR 3	LPS OTHER (SPECIFY)	
TPF 🗀	TEST ENGINEERS 1 PROPULSION TECH 1		
SPF □ PCR □	MECH/STRU/TH TECH		
ORB 🗆	AVIONICS TECHSAFETY ENGINEER1 QUAL CONT. TECH		
	TECHNICAL SUPPORT		
		PROCEDURES NEW CHANGE	
	TUG ORIENTATION: FACILITY □ HORIZONTAL 🗗	PAGES 3 2 MANHOURS 18 6	
SPACECRAFT D S		MANHOURS 10 0	
SOFTWARE REQUIRE LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	DMP DMP		
OPERATIONS:			
Using Tug	on-board Helium supply, purge	LO ₂ tanks. Monitor tank	
pressures. Vent to	Stop purge when concentration TBS psia and lock up.	n level begins to decrease.	
REMARKS:	· · · · · · · · · · · · · · · · · · ·		
Hazardous venting.	because of propellant in bay.	Done concurrently with LH ₂	
COMMODITIES/CONSU	JMABLES REQUIRED:		

FUNCTION NO:	FUNCTION TITLE:			
1.11	Purge L	H ₂ Tanks & Lines		
FUNCTION OBJECTIVE				
Verify no	LH ₂ remains	and reduce H ₂ gas o	concentration level.	
1 27	TIME TO COMPL		HAZARDOUS	
WTRCX	MAX	MIN2	YES. X. NO.	
AREA LOCATION OLF 🖄 OPF □ TPF □	TEST CONDUCT	EADCOUNT) WER3 FOR RS1 ECH1	GROUND SUPPORT EQUIPMENT LPS C OTHER M (SPECIFY) P-001	
SPF 🗆	MECH/STRU/TH	TECH		
ORB 🖸	AVIONICS TECH SAFETY ENGIN	-1 EER1		
		ECHPPORT		
			PROCEDURES NEW CHAI	VGE
TUG INTERFACE:	ACILITY 🗆	TUG ORIENTATION: HORIZONTAL []		2
SPACECRAFT S		VERTICAL D	MANHOURS18	6
SOFTWARE REQUIREM LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	MP			
and lock u	on-board Hel when concen	ium supply, purge I tration level begin	H ₂ tanks. Monitor tank pressures. ns to decrease. Vent to <u>TBS</u> psia	
REMARKS:	because of c	oncentrated H ₂ gas.		
COMMODITIES/CONSU	MABLES REQUI	RED:		

FUNCTION NO:	FUNCTION T	ITLE:	,		
1.12	Verify	Verify Tug Systems Safe & Prep to Move			
FUNCTION OBJECTIV	Ē:				
Verify pro	pellant/reac	tant tanks safe, d	disconnect safing GSE.		
SITE LOCATION ETR LY	TIME TO COMP		HAZARDOUS		
WTROX	MAX2	MIN	YES,NO.	X	
AREA LOCATION	PERSONNEL (F	MED A	GROUND SUPPORT EQUIPM LPS ☐ OTHER ☒ (SPI		
OLF 🕅	TEST CONDUC	TOR	OTHER EL (SPI	zG(F))	
OPF []			P-001		
SPF 🗆	MECH/STRU/TE	ECH 1			
PCR 🗆		H TECH	ļ 		
ORB 🗆	SAFETY ENGIN	EER1			
		ECH			•
	TECHNICAL SU	PPORT			
			PROCEDURES	NEW	CHANGE
TUG INTERFACE: ORBITER D F	ACILITY -	TUG ORIENTATION: HORIZONTAL 🛣	PAGES	3	2
SPACECRAFT D S		VERTICAL []	MANHOURS .	18	6
SOFTWARE REQUIRE LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL	IMP 🗍 IMP 🔯				
OTHER OPERATIONS:					
level. ∀e	Tug systems nt pressuran cal Servicin	t tanks to maximum	d and Mi'S tank pressur pressure of 1600 psia	es at safe . Remove	2
REMARKS;	· · · · · · · · · · · · · · · · · · ·				
Orbiter sy	stems safing	is Orbiter functi	on.		
COMMODITIES/CONSU	MARIES DEOLU	RED.			
1201ABAIOD LI 1E9/COM20	MINDEES READI	nev.			

FUNCTION NO:	FUNCTION TITLE:				
1.13	Safe and Remove Ordnance	Safe and Remove Ordnance			
FUNCTION OBJECTIV	E:				
Remove ord	nance items.				
SITE LOCATION	TIME TO COMPLETE (HRS)	HAZARDOUS			
ETR 🖾 WTR 🔼	MAX4 MIN2	YESXNO			
AREA LOCATION	PERSONNEL (HEADCOUNT)	GROUND SUPPORT EQUIPMENT			
OLF []	TOTAL MANPOWER 5 TEST CONDUCTOR	LPS OTHER (SPECIFY)			
OPF □ TPF 奴	TEST ENGINEERS 1				
SPF 🗀	PROPULSION TECH 2 MECH/STRU/TH TECH 1	-			
PCR ORB	AVIONICS TECH1 SAFETY ENGINEER1				
	QUAL CONT. TECH				
	TECHNICAL SUPPORT				
TUG INTERFACE:	TUG ORIENTATION:	PROCEDURES NEW CHANGE			
ORBITER - F	ACILITY 🗆 HORIZONTAL 🗀	PAGES			
SPACECRAFT D S		MANHOURS 72 18			
SOFTWARE REQUIRED LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	MP 🗆				
OPERATIONS:					
Safe ordna	nce mechanically, inspect ord	nance, remove igniters/ordnance.			
:					
·					
REMARKS:					
	nly if Tug requires ordnance				
1	vab radatten ofference				
COMMODITIES/CONSU	MABLES REQUIRED:	** · · · · · · · · · · · · · · · · · ·			
N/A					

FUNCTION NO:	FUNCTION TITLE:			
1.14	Service Fuel Cell Cryo Tanks			
FUNCTION OBJECTIV Safe Syste				
SITE LOCATION	TIME TO COMPI		HAZARDOUS	
ETR DX WTR DX	MAX	MIN3	YES. X NO.	
AREA LOCATION OLF OPF TPF SPF PCR ORB ORB	TEST CONDUCT TEST ENGINEE PROPULSION T MECH/STRU/TH AVIONICS TECH SAFETY ENGIN	WER4 FOR RS1 ECH2 H TECH H EER1	GROUND SUPPORT EQUIPMENT LPS OTHER KX (SPECIFY) P-002	•
		PPORT		
TUG INTERFACE: ORBITER	FACILITY D	TUG ORIENTATION: HORIZONTAL VERTICAL	PROCEDURES NEW PAGES 4 MANHOURS 24	2
SOFTWARE REQUIRED LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER OPERATIONS:	MP	V		,
drain H ₂ 0	from system	and purge cells to	remaining LO ₂ , purge LH ₂ & LO cells have been activated, remove moisture. Pressurize to 19 <u>+</u> 1 psia and lock up.	2
REMARKS: Hazardous	because of r	eactants.		
COMMODITIES/CONSU	IMABLES REQUI	RED:		

FUNCTION NO:	FUNCTION TI	TLE:		
1.15	Vent Pr	essurants to Safe	Level	
FUNCTION OBJECTIVE	Ē:			
Vent Tug p	ressurant to	safe work-around	level.	
SITE LOCATION	TIME TO COMPL	•	HAZARDOUS	
ETR (X) WTR (X)	MAX2	MIN	YES, X NO	
AREA LOCATION	PERSONNEL (H		GROUND SUPPORT EQUIPMENT	
OLF []	TOTAL MANPO	OR	LPS I OTHER I (SPECIFY)	
OPF 10	TEST ENGINEE	es 1	P-016	
SPF 🗆	PROPULSION T	ECH		
PCR 🗆	AVIONICS TECH	-		
ORB 🗆		EER1		
		PPORT		
			PROCEDURES NEW	CHANGE
TUG INTERFACE:	(- 1 in	TUG ORIENTATION:	PAGES3	2
	ACILITY []	HORIZONTAL C	MANHOURS 18	6
SPACECRAFT D S		VERTICAL E		
SOFTWARE REQUIRED LPS ORB ON-BOARD CO	MP 🗆			
TUG ON-BOARD CO GROUND CONTFOL OTHER				
lock up. REMARKS: Hazardous	pecause of pe	ersonnel working a	eximum pressure of 950 psia and	
sphere loc	k up pressur	e - 50 psia, LPS t	o monitor tank pressures.	
COMMODITIES/CONSU	MABLES REQUI	RED:		

在中心的人,是一个人,也是一个是一个人的人,就是一个人的人,就是一个人的人的,也是一个人的人的人,也是一个人的人的人,也是一个人的人,也是一个人的人的人,也是一个人的人的人的人,也是一个人的人的人,也是一个人的人的人,也是一个人,也是一个人的人,也是一个人的人,也是一个人,也是一

FUNCTION NO:	FUNCTION TITLE:			
2.1	Lea	k Check Pressuriza	ation System	
FUNCTION OBJECTIVE	:			
Verify In	itegrity of P	ressure System		
	TIME TO COMPLE		HAZARDOUS	
WTR []	MAX N	11N	YES, X NO	
1	PERSONNEL (HE TOTAL MANPOW	ADCOUNT) ER5	GROUND SUPPORT EQUIPMENT LPS XI OTHER XI (SPECIFY)	
OLF	TEST CONDUCTO	OR S1	P-011, P-016	
TPF (K)	PROPULSION TE	CH2	7 0113 2 010	- , - ,
l m		TECHERI		······································
ORB 🗆	SAFETY ENGINE QUAL CONT. TEC	ERL		
	TECHNICAL SUP	PORT		
TUG INTERFACE:	I _T	UG ORIENTATION:	PROCEDURES NEW PAGES 3	CHANGE 2
	ACILITY 🗆	HORIZONTAL C	MANHOURS 18	
SOFTWARE REQUIREM	·L		<u> </u>	
LPS ORB ON-BOARD COM TUG ON-BOARD COM GROUND CONTROL OTHER	MP 🗆			
OPERATIONS:				
30 minu check a	tes, maximum 11 mechanica	leakage TBD psi i L joints. Retain	H spheres (add facility heli Leak check system (decay) for n 30 minutes. Soap/bubble pressure in system for use du dicating condition.	
REMARKS: Period	11 - 1 C	. 1	13 1 1 to x DG	
		tank pressures wi ation clear person	11 be monitored by LPS. nel from area.	
COMMODITIES/CONSUM	MABLES REQUIR	ED:		
		Facility Helium		

FUNCTION NO:	FUNCTION TI	ITLE:	
2.2	Le.	ak Check LO ₂ Tank	
FUNCTION OBJECTIVE	:		
Verif	y LO ₂ System	m Integrity	
1	тіме то сомрі	LETE (HRS)	HAZARDOUS
ETR 🖾 WTR 🗇	MAX7	MIN 3	YESX NO
0.5.0		WER5	GROUND SUPPORT EQUIPMENT LPS (SPECIFY)
OPF D	TEST CONDUCT	FOR	P-016
TPF 🖸	PROPULSION T	ECH2	
1 son 🗆 1			
ORB 🗆	SAFETY ENGIN	H BEER1 ECH1	
ļ ļ	GO: 12 GO: 11: 11	PPORT	
			PROCEDURES NEW CHANG
TUG INTERFACE:	ACILITY []	TUG ORIENTATION: HORIZONTAL [PAGES
SPACECRAFT S		VERTICAL 図	MANHOURS 42 12
tank pr Leak ch - 1.5 p system	rea of pers essure for eck (decay) si in 30 mi mechanical	30 minutes. Open a tank for 30 minute nutes. Soap/bubble	ank to 31 ± 1 psia, stabilize access to essential personnel only. es, maximum allowable leakage a check propellant/pressure em to 19 ± 1 psia and lock up.
of tank	pressures	will be monitored b	pressure source. Periodic checks by LPS. Vent gas external to airlock. mm spheres are empty.

FUNCTION NO:	FUNCTION T	TLE:	
2.3	Leak	Check LH ₂ Tank	
FUNCTION OBJECTIVE	•		
 Verify LH ₂	System Int	egrity	
1	•		
SITE LOCATION	TIME TO COMPL	ETE (HRS)	HAZARDOUS
ETR D		MIN_3	YES NO
AREA LOCATION	PERSONNEL (H	EADCOUNT) ₅	GROUND SUPPORT EQUIPMENT
OLF 🗆	TOTAL MANPO	WER5	LPS (3 OTHER & (SPECIFY)
		RS2	P-016
1 1		TECH	
ORB 🗆	SAFETY ENGIN	EER 1	
		CH1	
		rruni	PROCEDURES NEW CHANGE
TUG INTERFACE:		TUG ORIENTATION:	PAGES74
ORBITER - F	ACILITY 🗆	HORIZONTAL 🔲	MANHOURS
SPACECRAFT S		VERTICAL 😥	WANTOUTS
SOFTWARE REQUIREN LPS ORB ON-BOARD CONTUG ON-BOARD CONTUG ON-BOARD CONTROL OTHER	MP 🗍		·
tank pr only. leakage pressur	ressures for Leak check e - l psi in re system me	40 minutes. Open (decay) tank for 30 minutes. Soap	ank to 32 ± 1 psia, stabilize access to essential personnel minutes, maximum allowable bubble check propellant/Vent system to 19 ± 1 psia and access.
REMARKS: Remain: of tank	ing onboard k pressure w	helium used as gas vill be monitored by	pressure source. Periodic checks LPS. Vent gas through burn stack.
COMMODITIES/CONSU Facili	MABLES REQU ty helium re	RED: equired if Tug heli	um spheres are empty.

FUNCTION NO:	FUNCTION TI	TLE:			
2.4	Service	Fuel Cells and Leak	Check Reactant Syst	em	
FUNCTION OBJECTIVE:					
Service : reactant		for deactivation, d	rain H ₂ O and leak ch	eck	
SITE LOCATION T	IME TO COMPL	ETE (HRS)	HAZARDOUS		
ETR 🔀 N	1AX <u>8</u>	MIN_3.5	YES_x NO)	
OLF 1 OPF 1 TPF & F SPF 1 PCR 1 ORB 2	PERSONNEL (HEADCOUNT) TOTAL MANPOWER		GROUND SUPPORT EQUIPORT EQUIPORT EQUIPORT (S		
	ECHNICAL SU	PPORT			
TUGINTERSACE	· · · · · · · · · · · · · · · · · · ·	TUG ORIENTATION:	PROCEDURES	NEW	CHANGE 5
TUG INTERFACE: ORBITER	CILITY	HORIZONTAL [] VERTICAL [3]		60	
to remo Clear a Stabili Leak ch minutes	fuel cell ve moisture rea of pers ze pressure eck (decay) . Soap/bub	and lock up with a onnel, pressurize of for 30 minutes, or system for 30 minuble check system me	in H ₂ O from system, postem, postent to blanket pressure of reactant tanks to opeopen access for essentites, maximum leakage echanical joints. Verindicating condition	19 ± 1 parating pricial person 3 psi in ent system	sia. essure. nnel. 30
will be	MABLES REQUI	by LPS.	dic checks of system		
racille	y nerrum re		ım spheres are empty	•	

FUNCTION NO:	FUNCTION TI	TLE:		!	
2.5	Vent Remaining Pressurant				
FUNCTION OBJECTIVE:					
Sofe Pr	essurizatio	n System			
Date		•			
\	TIME TO COMPL		HAZARDOUS		
WTR	MAX	MIN1	YES, X	NO	
	PERSONNEL (H	EADCOUNT) WER4	GROUND SUPPORT		
	TEST CONDUCT	OR			
TPF XD	TEST ENGINEE PROPULSION T	RS <u>1</u> ECH <u>2</u>	P-016		
SPF D	MECH/STRU/TH	! TECH			
1 1/		1			
		EER ECH1 PPORT			
		FFUNI	PROCEDURES	NEW	CHANGE
TUG INTERFACE:		TUG ORIENTATION:	 	PAGES5	
ORBITER	ACILITY D	HORIZONTAL ☐ VERTICAL ☑		HOURS30	
SOFTWARE REQUIREM				<u> </u>	
LPS ORB ON-BOARD COM	/P 🖸				
TUG ON-BOARD CON	AP 🗍				
GROUND CONTROL: OTHER					
OPERATIONS:					
Connect	precente ce	ervicing GSE, vent	oressure system	to maximum of	
950 psia	a and secure	e. Tag system indi	cating condition	n. Disconnect	
pressuri	ization and	leak check GSE.			
					·
1					
				•	
REMARKS: Hazardon	us due to p	ressure.			<u></u>
Pressur	ization syst	tem pressure period	ically monitored	d by LPS.	
		ere pressure at loc to airlock.	к up - 50 psia.		
COMMODITIES/CONSUM	· · · · · · · · · · · · · · · · · · ·				

FUNCTION NO:	FUNCTION TI	TLE:		
2.6	Sepa	arate Tug from Ada	pter	
FUNCTION OBJECTIVE	E:			
Remove	Deployment	Adapter from Tug f	a Maintenance and Refurbishment	:
SITE LOCATION ETR &	TIME TO COMPL		HAZARDOUS	
WTRO	MAX <u>4</u>	MIN2	YES, x NO	
AREA LOCATION	PERSONNEL (H	EADCOUNT) WER5	GROUND SUPPORT EQUIPMENT LPS □ OTHER (SPECIFY)	
OLF	TEST CONDUCT	OR		
TPF 🔀	LEST CHOINER	no	н-007	
SPF □ PCR □		ECH		·
ORB □	SAFETY ENGIN	1 EER1		
1	QUAL CONT. TE	ECH1		· · · · · · · · · · · · · · · · · · ·
		Fron:	PROCEDURES NEW	CHANGE
TUG INTERFACE:		TUG ORIENTATION:	PAGES5	
ORBITER D F	ACILITY D		MANHOURS 30	
SOFTWARE REQUIRE		VEITTONE A	!	
LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OT. IER	MP 🗆			
OPERATIONS:				
Dogital	on donlarmon	er adapton daller er	der edenter attech edenter	
suppor	t arms to ad	lapter at the adapt	der adapter, attach adapter er-orbiter interface attach-	
ment f	illings. Me	chanically demate	adapter from Tug intertank Move adapter for inspection	
	and lower do eaning.	orry support arms.	move adapter for inspection	
			•	
,				
REMARKS:				
Hazardo	ous due to mo	ovement.		
	 			
COMMODITIES/CONSC	JMABLES REQUI	RED:		
}				

FUNCTION NO:	FUNCTION TITLE:			
2.7	Tug Vis	ual Damage Inspect	ion	
FUNCTION OBJECTIVE	•			
		inspection of des ling damage.	ignated areas for eviden	nce of
SITE LOCATION	тіме то сомрі	LETE (HRS)	HAZARDOUS	
ETR *D WTR O	MAX8	MIN4	YES, NO	х
OLF OPF TPF D3 SPF	TEST CONDUCT TEST ENGINEE PROPULSION T MECH/STRU/TH	WER	GROUND SUPPORT EQUIPME LPS □ OTHER 图 (SPEC H-909, H-006	
ORB 🗆	AVIONICS TECH SAFETY ENGIN	H		
	QUAL CONT, TE	PPORT		
	TECHNICAL SO	rron1	PROCEDURES	NEW CHANGE
TUG INTERFACE: ORBITER	ACILITY [] DFTWARE []	TUG ORIENTATION: HORIZONTAL ☐ VERTICAL 🖄	PAGES MANHOURS	6 3 36 9
SOFTWARE REQUIREN LPS ORB ON-BOARD CON TUG ON-BOARD CON GROUND CONTROL OTHER	MP 🗀	•		·
and com LH mai cover o	aponents, he In shell, in	lium purge bags, î tertank area, engi	f S/C adapter, forward ntertank skirt and compose area. Install proted work activities.	onents,
REMARKS:				
COMMODITIES/CONSU	MABLES REQU	IRED: N/A		<u> </u>

FUNCTION NO:	FUNCTION T	TLE:		
2.8	Clean Tug and Prepare to Move			
FUNCTION OBJECTIVE	: :			
		mpatible with clas intenance and chec	s 100,000 cleanliness requirements kout	
SITE LOCATION	TIME TO COMPL	ETE (HRS)	HAZARDOUS	
ETR 🗗 WTR 🗁	MAX12	MIN	YES NOx	
AREA LOCATION OLF □ OPF □ TPF ☑ SPF □	TOTAL MANPOWER 6 TEST CONDUCTOR TEST ENGINEERS 1 PROPULSION TECH 1		GROUND SUPPORT EQUIPMENT LPS □ OTHER □ (SPECIFY) H-018	
PCR □ ORB □	AVIONICS TECH SAFETY ENGIN QUAL CONT. TE	!1 EER ICH1		
	TECHNICAL SU	PPORT	DOGGEDURES NEW OWNER	
TUG INTERFACE: ORBITER	ACILITY 🗓 OFTWARE 🗆		PROCEDURES NEW CHANGE PAGES 9 5 MANHOURS 54 15	
SOFTWARE REQUIREM LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	MP [] MP []			
			and vacuum to meet cleanliness ment for hoisting and disconnect	
GUE				
REMARKS:				
COMMODITIES/CONSU	MABLES REQUI	RED: Cleaning c	nemical	

FUNCTION NO:	FUNCTION T	ITLE:	· ·	
2.9	Move into TPF Checkout Area			
FUNCTION OBJECTIVE	:			
Move Tug	to 100,000	clean area for mai	ntenance and checkout	
SITE LOCATION 1	ГІМЕ ТО СОМРІ	LETE (HBS)	HAZARDOUS	
1 1		MIN3	YES NO NO	
AREA LOCATION	AREA LOCATION PERSONNEL (HEADCOUNT)		GROUND SUPPORT EQUIPMENT	
1 <u>CLF</u> U			LPS ☐ OTHER ☑ (SPECIFY)	
TPF 😡	PROPULSION T	RSI ECH	11 VS11 11 000	
PCR 🗆	AVIONICS TEC	1 TECH		
	QUAL CONT. TE	EER 1		
	TECHNICAL SU	PPORT	PROCEDURES . NEW	CHANGE
TUG INTERFACE: ORBITER		TUG ORIENTATION:	PAGES 4	
SPACECRAFT D SO			MANHOURS <u>24</u>	6
SOFTWARE REQUIREM				
ORB ON-BOARD COM TUG ON-BOARD COM GROUND CONTROL S OTHER	1P 🛄			
OPERATIONS:				
Move Tu	g from airle	ock into TPF check	out area, install in Tug	
			rms, remove handling GSE.	
				·
REMARKS:				······································
Hazardou	is due to ho	isting operations		:
COMMODITIES/CONSUM	ABLES REQUI	RED:		
				1

FUNCTION NO:	FUNCTION T	TLE:			
2.10	Isolat	e Failed Hardware C	ausing Mission Anomal	ies	
FUNCTION OBJECTIVE					
Trouble	eshoot and i	dentify discrepant	components (LRU) which	h-have	
	mission ano				
	·				
_	TIME TO COMPL	ETE (HRS) MIN8	HAZARDOUS	v	
WTR			YESNO_		
	PERSONNEL (H TOTAL MANPO	WER8	GROUND SUPPORT EQUIPM LPS ☐ OTHER □ (SPE		
OLF 🗆	TEST CONDUCT	ror1 rs2	as required		
	PROPULSION T	ECH			·
PCR 🗆	MECH/STRU/TH AVIONICS TECH	12			
ORB []	SAFETY ENGIN	EER	H		
		PPORT			
TUG INTERFACE:		TUG ORIENTATION:	PROCEDURES	NEW 6	CHANGE 3
ORBITER - F	ACILITY 🗆	HORIZONTAL 🖸	MANHOURS .		
SPACECRAFT SI		VERTICAL E			,
LPS ORB ON-BOARD COI TUG ON-BOARD COI GROUND CONTROL OTHER	MP □ MP □				
OPERATIONS:					
			nformation source, st		
			te analamous performants for replacement.	ice to	
		_	•		
REMARKS:					
		,			
COMMODITIES/CONSU	MABLES REQUI	RED:			
		Facility power			

FUNCTION NO:	FUNCTION TI	TLE:		
2.11	Scheduled Tug Pre-Maintenance Tests			
FUNCTION OBJECTIVE				
Complete	e scheduled	functional and leal	r checks	
Complete	e seneaure	Tuncibile and Told		
SITE LOCATION	TIME TO COMPL	ETE (HRS)	HAZARDOUS	
	MAX		YES NOx	
	ON PERSONNEL (HEADCOUNT)		GROUND SUPPORT EQUIPMENT	
OLF [TOTAL MANPOWER 9		LPS (M) OTHER XD (SPECIFY)	
OPF []		RS2	A-001, A-002, A-003, A-006, A-007	
SPF 🗆	MECH/STRU/TH AVIONICS TECH	I TECH1	A-008, A-009, A-010, P-011, P-016	
ORB 🗆	SAFETY ENGIN	EER		1
		PPORT		
		THE COLEMAN	PROCEDURES NEW CHAN	IGE
	ACILITY []	TUG ORIENTATION:	PAGES 20 10 MANHOURS 120 30	
SPACECRAFT SO		VERTICAL 🖭	WANTOONS	
LPS ORB ON-BOARD CONTUG ON-BOARD CONGROUND CONTROL	VIP 🖸			
OPERATIONS:				····
calibra check p	tion. Perfo urge bag and	orm engine leak and	ment systems end to end functional tests. Leak e contamination. Leak y check system.	
REMARKS:				
COMMODITIES/CONSU	MABLES REQUI	RED: Helium, GN ₂	, Facility Power	

FUNCTION NO:	FUNCTION TI	TLE:		
2.12	Scheduled Tug Maintenance and Modification			
FUNCTION OBJECTIVE	E:			
Accompl	ish schedule.	ed maintenance, ins	pection and servicing	
SITE LOCATION ETR 🖾	TIME TO COMPL		HAZARDOUS YESNO_x	
WTR 🗀				
AREA LOCATION OLF CPF TPF SPF	PERSONNEL (HEADCOUNT) TOTAL MANPOWER 10 17** TEST CONDUCTOR 1 3*** TEST ENGINEERS 2 3*** PROPULSION TECH 2 3***		GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY) S-001, S-002	
PCR □ ORB □	SAFETY ENGIN QUAL CONT. TE	1 2 5**	P-014, P-019, P-006	
			PROCEDURES NEW	CHANGE
TUG INTERFACE: ORBITER	ACILITY OFTWARE	TUG ORIENTATION: HORIZONTAL 〇 VERTICAL 首	PAGES 14 MANHOURS 84	7 21
SOFTWARE REQUIRED LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	OMP O			
elemen Replac and cy condit in jac	ts as requir e/verify ope cle. Servic ion of passi ked propella	ed by operating time ration of component e active thermal control nt line joints. W	npling on structural ne/cycle and conditions. s based on operating times ontrol system, verify systems. Verify vacuum nen maintenance required gine alignment GSE.	,
REMARKS:				
COMMODITIES/CONSU	JMABLES REQU	IRED:		

FUNCTION NO:	FUNCTION TI	TLE:	1
2.13	Adapte	r Visual Damage Ins	pection
FUNCTION OBJECTIVE	Post-f	light visual inspec	tion for evidence of flight and/or
handling damage.			<u>-</u>
SITE LOCATION	TIME TO COMPL	LETE (HRS)	HAZARDOUS
ETR 🔀 WTR 🗇	MAX <u>6</u>	MIN4	YES NOX
AREA LOCATION	PERSONNEL (H	EADCOUNT)	GROUND SUPPORT EQUIPMENT
OLF 🗆	TEST CONDUCT	WER	LPS [] OTHER 豆 (SPECIFY)
OPF □ TPF Ø	TEST ENGINEE	RS 1	н-003, н-007
SPF 🗆	MECH/STRU/TH	TECH	
PCR □ □ □	AVIONICS TECH	11	
	QUAL CONT, TE	EER	
		PPORT	
			PROCEDURES NEW CHANGE
TUG INTERFACE:	ACILITY 🗆	TUG ORIENTATION: HORIZONTAL []	PAGES
SPACECRAFT 🗆 S		VERTICAL 🛱	MANHOURS 24 6
SOFTWARE REQUIRED LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	MP □ MP □		
and spot in Deplo outer skin, umbil lines, fittings a	yment Adapto icals, latch	er Workstand. Perf ling and "drive med	to inspection and cleaning area orm visual inspection of inner and hanism, interface rings pressure discrepant items and tag.
REMARKS:			
COMMODITIES/CONSU	MABLES REQUI	RED: N/A	

FUNCTION NO:	FUNCTION TI	TLE:		
2.14	Clean	and Prep to Move A	dapter	
FUNCTION OBJECTIVE cleanliness requi			atible with class 100,000 nance and checkout.	
SITE LOCATION	TIME TO COMPL	ETE (HRS)	THAZARDOUS	
ETR 🖾 WTR 🗀	MAX6	_	YES NO	X
AREA LOCATION OLF OPF TPF 120 SPF PCR ORB	TEST CONDUCT TEST ENGINEES PROPULS. 1-N TI MECH/STRU/TH AVIONICS TECH	NER 5 OR	GROUND SUPPORT EQUIPMENT LPS (SPECIFY) H-007	
ORB D	SAFETY ENGIN QUAL CONT. TE	EER		
	TECHNICAL SU	PPORT	PROCEDURES NEW	CHANGE
TUG INTERFACE:		TUG ORIENTATION:	7	
ORBITER DF SPACECRAFT DS	ACILITY 🗀	HORIZONTAL 🗍 VERTICAL 🔯	MANHOURS24	6
100,000 cleanline	MP	with cleaning che	emical and vacuum to meet cleer handling equipment.	.ass
REMARKS:				
COMMODITIES/CONSU	JMABLES REQUI	RED: Cleaning cher	nicals	

FUNCTION NO:	FUNCTION T	ITLE:		
2.15	Move :	into TPF Checkout .	Area	
FUNCTION OBJECTIV	E: Move	adapter to 100,000	clean area for maintenance and ch	eckout
SITE LOCATION ETR WTR WTR AREA LOCATION OLF OPF TPF SPF OPF ORB ORB	PERSONNEL (H TOTAL MANPO TEST CONDUCT TEST ENGINEE PROPULSION T MECH/STRU/TH AVIONICS TECH SAFETY ENGIN QUAL CONT. TE	LETE (HRS) MIN_2 EADCOUNT) WER_2 FOR RS_1 ECH H TECH H EER1 ECH PPORT		
			PROCEDURES NEW C	CHANGE
TUG INTERNACE:	ACHITY []	TUG ORIENTATION:	PAGES	3
ORBITER D S SPACECRAFT D S	FACILITY [] SOFTWARE []	HORIZONTAL [7] VERTICAL E	MANHOURS30	9
	DMP		eckout area, install in adapter move handling GSE.	
REMARKS: Hazardous of COMMODITIES/CONSU		ng operations		

FUNCTION NO:	FUNCTION TITLE:	
2.16	Isolate Hardware Causing	Anomalies
FUNCTION OBJECTIVE caused anomolies	TIOUDIESHOOF SHO ISOTATE	components (LRU's) which have
l . _	TIME TO COMPLETE (HRS) MAX 5 MIN 3	HAZARDOUS YES
AREA LOCATION OLF OPF TPF SPF PCR O	PERSONNEL (HEADCOUNT) TOTAL MANPOWER6	GROUND SUPPORT EQUIPMENT LPS 図 OTHER 図 (SPECIFY) A-014
	TECHNICAL SUPPORT	
		PROCEDURES NEW CHANGE
TUG INTERFACE:	TUG ORIENTATION:	PAGES53
ORBITER D F SPACECRAFT D S	ACILITY [] HORIZONTAL [] OFTWARE [] VERTICAL []	MANHOURS
	MP	eshoot as required to accomplish anomalies on the previous mission.
REMARKS:		
COMMODITIES/CONSU	MABLES REQUIRED: Facility powe	2r

FUNCTION NO:	FUNCTION TI	TLE:	
2.17	Schedu	led Adapter Mainten	ance and Modification
FUNCTION OBJECTIV	E: Accomp	lish scheduled main	tenance, inspection and servicing.
SITE LOCATION ETR WTR AREA LOCATION OLF OPF TPF SPF PCR	PERSONNEL (H TOTAL MANPO TEST CONDUCT TEST ENGINEE PROPULSION T MECH/STRU/TH	EADCOUNT) WER FOR RS ECH2 I TECH	HAZARDOUS YESNOX GROUND SUPPORT EQUIPMENT LPS \(\text{LPS \(\text{T}\)}\) OTHER \(\text{X}\) (SPECIFY) A-014, P-011, P-016 P-001
ORB D	SAFETY ENGIN QUAL CONT. TO	t tug orientation:	PHOCEDURES NEW CHANGE PAGES 7 4
	ACILITY SOFTWARE	HORIZONTAL 🗍 VERTICAL 🖎	MANHOURS 42 12
Functional check components base Perform function every TBD flight	OMP OMP OMP OMP OTHER TO THE	essurization plumbi ng times and cycles	mpling on structural elements. ng. Replace/verify operation of Perform modifications required. S/C mass, C.G. simulators after ment.
REMARKS:			
COMMODITIES/CONSU	JMABLES REQU	IRED: GN ₂ , Facil	lity Power

FUNCTION NO:	FUNCTION TI	TLE:		
2.18	Purge L	H ₂ tank		
FUNCTION OBJECTIVE Reduce H ₂ gas		on to safe level f	or transportation to KSC	
SITE LOCATION	TIME TO COMPL	ETE (HRS)	HAZARDOUS	
ETR 🗆 WTR 📆	MAX8	M1N_4	YESxNO	-
AREA LOCATION OLF OPF TPF SPF OPE OPE OPE OPE OPE OPE OPE OPE	PERSONNEL (HEADCOUNT) TOTAL MANPOWER		GROUND SUPPORT EQUIPMENT LPS ★ OTHER (SPECIFY) P-016	
PCR 🗆 ORB 🗆	AVIONICS TECH SAFETY ENGIN	H1 EER1		
	QUAL CONT. TE	ECH		
			PROCEDURES NEW C	HANGE
TUG INTERFACE:	ACILITY [TUG ORIENTATION: HORIZONTAL (E)	PAGES3	2
SPACECRAFT D S		VERTICAL	MANHOURS 18	6
SOFTWARE REQUIREM LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER OPERATIONS:	MP 🗆			
Using Tug on- Stop purge wh Vent to 18 ±	board helium en concentra l psia and l	supply purge LH ₂ tion level is four ock up.	tanks. Monitor tank pressures. per cent H ₂ by volume or less.	
REMARKS: Hazardous bec Vent gas exte		entrated H ₂ gas.		
COMMODITIES/CONSU Facility heli		RED if Tug helium sphe	eres are empty.	

FUNCTION NO:	FUNCTION T	ITLE:	
2.19	Service F	uel Cells and Furge	Reactant Tanks
FUNCTION OBJECTIVE Service fuel		ctivation and safe	reactant tanks for transportation
SITE LOCATION ETR [] WTR [] AREA LOCATION	PERSONNEL (H	MIN4 EADCOUNT)	HAZARDOUS YESX NO GROUND SUPPORT EQUIPMENT
OLF () OPF (2) TPF () SPF () FOR () ORB ()	TEST CONDUCT TEST ENGINEE PROPULSION T MECH/STRU/TH AVIONICS TECH SAFETY ENGIN QUAL CONT. THE	WER 5 FOR RS 1 ECH 2 H TECH 1 EER 1 ECH PPORT PPORT	P-002,
TUG INTERFACE: ORBITER	ACILITY 🗆	TUG ORIENTATION: HORIZONTAL & VERTICAL	PROCEDURES NEW CHANGE PAGES 8 4 MANHOURS 48 12
SOFTWARE REQUIREM LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	MP 🗍		
moisture and tank. Monitor	lock up with r tank press	a blanket pressure ures. Stop purge w	rom system, purge fuel cells to remove of 19 ± 1 psia. Purge LH, reactant hen concentration level is four per ight pressure and lock up.
REMARKS: Hazardous bec	ause of H ₂ g	as concentration.	
MMODITIES/CONSU			
racility heli	um required	if Tug spheres empt	у•

FUNCTION NO:	FUNCTION T	ITLE:		
2.20	Visual	External Damage In	spection	
FUNCTION OBJECTIV	<u> </u>			
Post flight for shipmen	visual insp t to KSC	ection of designat	ed areas in preparation	
SITE LOCATION ETR D WTR 131	TIME TO COMP	LETE (HRS) MIN 2	HAZARDOUS YESNO ×	
AREA LOCATION OLF OPF TPF SPF PCR ORB ORB	TEST ENGINEE PROPULSION T MECH/STRU/TH	WER / FOR	GROUND SUPPORT EQUIPMENT LPS ① OTHER ② (SPECIFY)	
		PPORT		
TUG INTERFACE:		TUG ORIENTATION:	PROCEDURES NEW	
ORBITER D F			PAGES 4 MANHOURS 24	
LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER OPERATIONS: Perform a vi Deployment a	STATION []	inspection of extward skirt, LH ₂ ma	erior surfaces as follows: in shell and intertank skirt.	
HEMARKS: N/A				
COMMODITIES/CONSU N/A	MABLES REOU!	RED:		

FUNCTION NO:	FUNCTION TI	TLE:	1	
2.21	Prepare	to Ship		
FUNCTION OBJECTIV	E:			
Prepare Tug fo	or shipment t	co KSC		
SITE LOCATION	TIME TO COMPI	·	HAZARDOUS	
ETR□ WTR®	MAX <u>10</u>	MIN5	YES, NO	
AREA LOCATION	PERSONNEL (H	EADCOUNT) WER6	GROUND SUPPORT EQUIPMENT	
OLF OPF OR	TEST CONDUCT	OR	LPS OTHER (SPECIFY)	
TPF C	TEST ENGINEE	RS1	н-024, н-018, н-019	
SPF □ PCR □	MECH/STRU/TH	ECH3	İ	
ORB 🗆	SAFETY ENGIN	i EERI		
	QUAL CONT. TI	PPORT		
	TECHNICAL SU	PPURI	PROCEDURES NEW	CHANGE
TUG INTERFACE:	1	TUG ORIENTATION:	PAGES	CHANGE
ORBITER D	ACILITY D	HORIZONTAL 🛭	MANHOURS	
SPACECRAFT SOFTWARE REQUIRE		VERTICAL		-
LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	DMP C			
OPERATIONS:				
		ist and install Tug strumentation kit fo	and adapter in cargo canister. or Tug movement.	
REMARKS:				
Hazardous beca	ause of Tug f	nandling		
COMMODITIES/CONSU	JMABLES REQUI	RED:		
:				

0	FUNCTION T	1146.		
2.22	Move to	OLF		
FUNCTION OBJECTIV Move Tug fro		for loading and t	ransport to KSC	
SITE LOCATION	TIME TO COMP	LETE (HRS)	HAZARDOUS	
ETR [] WTR [X]	MAX2	MIN1	YESx NO	
AREA LOCATION OLF OPF TPF SPF PCR ORB	TEST CONDUC' TEST ENGINEE PROPULSION T MECH/STRU/TH AVIONICS TECH SAFETY ENGIN	EADCOUNT) 2 WER	GROUND SUPPORT EQUIPMENT LPS □ OTHER 图 (SPECIFY) H-024	
<u>Transportation</u>		ECH PPORT		
TUG INTERFACE:		TUG ORIENTATION:	PROCEDURES NEW PAGES 2	CHANGE 1
ORBITER D SPACECRAFT D S	FACILITY SOFTWARE	HORIZONTAL ₺☐ VERTICAL ☐	MANHOURS <u>12</u>	3
ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTRO OTHER OPERATIONS: Using the pr	DMP □ L STATION □ □	w the Tug in the c	argo canister to the OLF.	

FUNCTION NO:	FUNCTION TI	TLE:			
2.23	Load	d on aircraft and	ship to ETR		
FUNCTION OBJECTIVE		· · · · · · · · · · · · · · · · · · ·			
Transport Tug	from WTR to	o ETR			
l l	TIME TO COMPL		HAZARDOUS		
ETR [] WTR [2]	иах <u>6</u> .	MIN4	YESXNO		
	PERSONNEL (HE		GROUND SUPPORT EQUIPME		
OLF 🔂	DLF 🖼 TEST CONDUCTOR		LPS [] OTHER [] (SPEC	JIFY)	
OPF [TEST ENGINEER	RS1	H-022		
SPF 🗅		TECH			
PCR U	AVIONICS TECH	1			
I 1'		EER			<u> </u>
		PPORT			
			PROCEDURES	NEW	CHANGE
TUG INTERFACE:		TUG ORIENTATION: HORIZONTAL X	PAGES _		2
ORBITER D FA	ACILITY D	VERTICAL	MANHOURS	18	6
into the MD to position MDF and the piggyback o	MP	will be detached of the MDF. The will be attached to tached will be town	ves at the OLF it will from the transporter an 747 will then be towed o the aircraft. The 74 ed out of the MDF and t	nd raised into the 7 with	
i					
Hazardous bed	cause of tra	nsportation			
COMMODITIES/CONSU	MABLES REQUI	RED:			

FUNCTION NO:	FUNCTION T	ITLE:		
2.24.	Verify 7	Tug Status, Check !	Transport Data	
FUNCTION OBJECTIV	E:			
Check transp	portation env	/ironment		
SITE LOCATION ETR 🖾	TIME TO COMPI		HAZARDOUS	······································
WTR [MAX	MIN1	YES NO X	
AREA LOCATION OLF 173 OPF 113	PERSONNEL (H TOTAL MANPO TEST CONDUCT	EADCOUNT) WER 4 FOR 1	GROUND SUPPORT EQUIPMENT LPS (SPECIFY)	
TPF SPF	PROPULSION T	ECH	н-023	
PCR □	AVIONICS TECH	1 TECH		
ORB 🗆	SAFETY ENGIN	EER		
		PPORT		
TUG INTERFACE:		TUG ORIENTATION:	PROCEDURES NEW	
ORBITER 🗆 F	ACILITY D	HORIZONTAL 🛭	PAGES2 MANHOURS12	-
SPACECRAFT ☐ S SOFTWARE REQUIRES		VERTICAL		
LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	IMP 🖸			
OPERATIONS:				
Examine tran damage	isport instru	mentation data for	r indication of possible Tug	
REMARKS: N/A				
COMMODITIES/CONSU	IMABLES REQUI	RED:		
N/A		_		

FUNCTION NO:	FUNCTION TI	ITLE:	1		
2.25	Condition	on Inspection			
FUNCTION OBJECTIVE	E:				
Visually ve	rify condition	on of Tug			
	TIME TO COMPI		HAZARDOUS		
ETR 520 WTR	MAX2	MIN1	YES, NO)X	
AREA LOCATION	PERSONNEL (H	EADCOUNT)	GROUND SUPPORT EQUI	MENT	
OLF 🗆		WER6	LPS OTHER ED (S	PECIFY)	
OPF □ TPF □3x	TEST ENGINEE	RS	as required		
SPF □	IMECH/STRU/TE	ECH11 TECH1			
PCR 🗆	AVIONICS TECH	H			
	QUAL CONT. TI	ECH3		···	
	TECHNICAL SU	PPORT	PROCEDURES	NEW	CHANGE
TUG INTERFACE:		TUG ORIENTATION:	 	34	
ORBITER □ F SPACECRAFT □ S	ACILITY D	HORIZONTAL [] VERTICAL ᡚ			6
SOFTWARE REQUIRE		VERTICAL AL	<u> </u>		
LPS ORB ON-BOARD CO					
TUG ON-BOARD CO	MP 📋				
GROUND CONTROL OTHER					
OPERATIONS:					
Remove acces	ss/inspection	n panels and visual	lly inspect Tug for f	light	
and transpor	tation damag		dition, i.e., hazardo		ions,
cleanliness,	, etc.				
REMARKS:	···				<u></u>
n/A					
COMMODITIES/CONSU	MABLES REQUI	RED:			
N/A					
A1,					

FUNCTION NO:	FUNCTION II	ITLE:		
2.26	Internal	Area Cleaning		
FUNCTION OBJECTIV	E:			
Clean interna	ıl areas to b	e compatible with	cleanliness requirements.	
		•	•	
SITE LOCATION ETR 🖄	TIME TO COMPI		HAZARDOUS	
WTR 🗆	MAX _/	MIN4	YES. NO x	·····
AREA LOCATION	PERSONNEL (H	EADCOUNT) WER6	GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY)	
OLF OPF	TEST CONDUCT	TOR		
TPF 23 SPF D		RS1 ECH1 HTECH2		
PCR C	MECH/STRU/TH AVIONICS TEC	H TECH2		
ORB []	SATETY ENGIN	IEER ECHl	l	
		PPORT		
		THE COURT TO	PROCEDURES NEW CHA	
	FACILITY []	TUG ORIENTATION: HORIZONTAL	PAGES MANHOURS	<u> </u>
SPACECRAFT D		VERTICAL 🗵	IVIANDOUNS	
SOFTWARE REQUIRE				
ORB ON-BOARD CO	OMP 🔲			
GROUND CONTRO	LSTATION 🖂			
OPERATIONS:				
Wipe down int	ernal areas	of Tug with cleani	ng chemical and vacuum to meet	
cleanliness r			and thousand and thousand to meet	
			·	
REMARKS:				
Factory clear	n processing			
COMMODITIES/CONS	JMABLES REQU	IRED:		
Cleaning	chemical			
<u> </u>				

FUNCTION NO:	FUNCTION TI	TLE:			
2.27	Int	ternal Area Cleanin	g		
FUNCTION OBJECTIVE:					
Clean internal	area to be	compatible with cl	eanliness requirement	:s.	
_					
	IME TO COMPL	· · · · ·	HAZARDOUS		
WTR"	//AX3	MIN2	YESNO		
0.5 5 1	PERSONNEL (H FOTAL MANPO)	WER	GROUND SUPPORT EQUIP LPS ☐ OTHER ☑ (SP		!
) VLF LJ [7	FEST CONDUCT	ORRS	н-007		
TPF XI	PROPULSION TO	ECH. 1			
SPF L	MECH/STRU/TH	TECH2			
PCR C	AVIONICS TECH	1 <u> </u>			
	DUAL CONT. TE	EER ECH1			
	FECHNICAL SU	PPORT			
			PROCEDURES	NEW	CHANGE
TUG INTERFACE:		TUG ORIENTATION:	PAGES	2	1_
	CILITY D	HORIZONTAL [MANHOURS		3
SPACECRAFT SO		VERTICAL (X	III/AII/OIIO		
SOFTWARE REQUIREM.	ENTS:				
ORB CN-BOARD COM	1P 🗀				:
TUG ON-BOARD COM GROUND CONTROL S					!
OTHER		•		•	
OPERATIONS:					
Wipe down inter	rnal areas	of Adapter with cle	aning chemical and va	acuum to me	et.
cleanliness re		- I marpoon (pain and			
REMARKS:					<u></u>
Factory clea	an processi	ng			····
COMMODITIES/CONSUM	MABLES REQUI	RED:			
Cleaning Chemi	cal				

FUNCTION NO:	FUNCTION TI	TLE:			
3.1	Unsched	uled Tug Maintenanc	e		!
FUNCTION OBJECTIVE				-	
	unschedule is results.	d maintenance requi	red by flight and tes	t data	
SITE LOCATION	TIME TO COMPL	ETE (HRS)	HAZARDOUŞ		
ETR 54 WTR []	MAX <u>*</u>	MIN <u>as requ</u> ired	YES,NO_	x	
OLF OPF TPF SPF PCR O	PROPULSION TO MECH/STRU/TH AVIONICS TECH SAFETY ENGIN	WER 6 12* TOR 1 RS 1 3* ECH 1 2* I TECH 1 2* H 2* 2*	GROUND SUPPORT EQUIPM LPS □ OTHER ED (SPE as required		
		CH <u>13*_</u> PPORT			
			PROCEDURES	NEW	CHANGE
TUG INTERFACE:	A0:11TV [TUG ORIENTATION:	PAGES .	14	7
ORBITER D F SPACECRAFT D S	ACILITY 🗆 OFTWARE 🗆	HORIZONTAL □ VERTICAL ☑	MANHOURS.	84	21
SOFTWARE REQUIREM LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	☐ MP ☐ MP ☐			··-	
trend a ment of require On Tug	analysis the E LRU's and ed. engineering	requirements for u in-place refurbishm	test/inspection data nscheduled maintenanc ent of systems or str s panels and LRUs to	e and refu uctures as	rbish-
DEMARKS					
	me to comple ely 16 hours		ng in line refurbishme	ent	
COMMODITIES/CONSU	MABLES REQUI	RED:			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,

FUNCTION NO:	FUNCTION TITLE:	
3.2	Unscheduled Adapter Maint	enance
FUNCTION OBJECTIVE test data analys	Perform unscheduled maint	enance required by flight and
SITE LOCATION	TIME TO COMPLETE (HRS)	HAZARDOUS
	MAX * MIN as required	YES. NO X
	PERSONNEL (HEADCOUNT) TOTAL MANPOWER 5 10* TEST CONDUCTOR TEST ENGINEERS 1 2* PROPULSION TECH 3*	GROUND SUPPORT EQUIPMENT LPS OTHER OFFICE As Required
SPF D PCR D ORB D	MECH/STRU/TH TECH1 AVIONICS TECH1 SAFETY ENGINEER QUAL CONT. TECH 1 2* TECHNICAL SUPPORT	
	TECHNICAE SOFFORT	PROCEDURES NEW CHANGE
TUG INTERFACE: ORBITER	TUG ORIENTATION: ACILITY HORIZONTAL OFTWARE VERTICAL	PAGES <u>6</u> <u>3</u> MANHOURS <u>36</u> 9
SOFTWARE REQUIREM LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	© MP □ MP □	
refurbishment wh	mplish unscheduled component re ere flight data and ground tes l parameter limits. Ing model demonstrate engine ch	ts/inspections indicate malfunction
REMARKS: * Maximum time approximate	e to complete without impacting ly 5 hours.	g in line refurbishment
COMMODITIES/CONSU	MABLES REQUIRED: N/A	

FUNCTION NO:	FUNCTION TI	TLE:	
4.1	Unloa	d from Aircraft	
FUNCTION OBJECTIVE			
Safely un	load Tug fro	m Aircraft	
		·	
SITE LOCATION	TIME TO COMPL	ETE (HRS)	HAZARDOUS
I	MAX10		YES X NO
AREA LOCATION	PERSONNEL (H		GROUND SUPPORT EQUIPMENT
l ort n	TOTAL MANPOL TEST CONDUCT	WER <u>2 5* 5**</u> OR	LPS OTHER (SPECIFY)
OPF LI	TEST ENGINEE	RS1	н-022
		ECH	;
l l	SAFETY ENGIN		
		ECH1* 1*** PPORT	
			PROCEDURES NEW CHANGE
TUG INTERFACE:	ACILITY 🗆	TUG ORIENTATION: HORIZONTAL 図	PAGES
SPACECRAFT SPACECRAFT		VERTICAL D	MANHCURS 18 6
SOFTWARE REQUIREN	MENTS:		
ORB ON-BOARD CO	MP 🗆		
GROUND CONTROL	STATION 🗆		
OTHER OPERATIONS:			
	onaine abus	dorm and seat flic	the about the 747 will be tored
into the MD	F. The carg	o canister will be	tht checks, the 747 will be towed disconnected and lifted free of the
			of the MDF, and the cargo canister The canister will be lowered and
attached ot			the canister will be lowered and len be towed to the processing
facility.			
REMARKS:			
COMMODITIES/CONSU	MABLES REQUI	RED:	
L		·	

FUNCTION NO:	FUNCTION TI	TLE: Verify Tank	Breather Assembly Operation &	
4.2	Check Transport Instrumentation			
FUNCTION OBJECTIVE Verify propert.		desiccant condition	on and check transportation environ-	
SITE LOCATION	тіме то сомрі	ETE (HRS)	HAZARDOUS	
ETR EX		MIN1	YES NOX	
AREA LOCATION OLF IX OPF TPF SPF PCR ORB	TEST ENGINEE PROPULSION T MECH/STRU/TH AVIONICS TECH SAFETY ENGIN	WER 4 FOR	GROUND SUPPORT EQUIPMENT LPS OTHER \(\text{SPECIFY} \) H-020, H-023	
	LOWE COM	ECH		
TUG INTERFACE: ORBITER	FACILITY [TUG ORIENTATION: HORIZONTAL (公) VERTICAL	PROCEDURES NEW CHANGE PAGES 2 1 MANHOURS 12 3	
condition. of possible	OMP DOMP DOMP DOMP DOMP DOMP DOMP DOMP D	ansportation instr	olies for filter and desiccant amentation data for indication	
REMARKS: N/A				
COMMODITIES/CONSU	JMABLES REQU	IRED:		

FUNCTION NO:	FUNCTION TITLE:		
4.3	Move to Tug Process	sing Facil:	ity
FUNCTION OBJECTIVE	: 0		
Move Tug f	om OLF to TPF for rece	iving and :	inspection activities.
SITE LOCATION	TIME TO COMPLETE (HRS)		AZARDOUS
ETR Ø WTR□	MAX 16 MIN 4	Y	'ES, x NO
AREA LOCATION	PERSONNEL (HEADCOUNT) TOTAL MANPOWER 2 8	Į.	ROUND SUPPORT EQUIPMENT PS OTHER (SPECIFY)
OLF [] OPF []	TEST CONDUCTOR TEST ENGINEERS 1		
TPF □	PROPULSION TECH	2**	н-025, н-018, н-004, н-001
SPF □ PCR □	MECH/STRU/TH TECH5: AVIONICS TECH	<u>* 3**</u> -	н-032
ORB [] Transportation	SAFETY ENGINEER 1 QUAL CONT. TECH 2:	ļ	
	TECHNICAL SUPPORT		
	Tue court		PROCEDURES NEW CHANGE
	ACILITY (1 HORIZONTA		PAGES 2 1
SPACECRAFT D S			MANHOURS
LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	MP 🗆 MP 🗇		
OPERATIONS: Using the I	rime Mover tow the Tug	in the Tu	g Transtainer to the TPF airlock.
			ling equipment. Rotate Tug to move Tug access and inspection
DCMA DISC			
REMARKS:			
Hazardous	due to movement and hoi	sting	
COMMODITIES CONSU	IMABLES REQUIRED:		
N/A			

FUNCTION NO:	FUNCTION TI	TLE:		
4.3A	Move to T	PF C/O Cell		
FUNCTION OBJECTIVE	:			
Transport Tug f	rom OLF to	TPF for receiving	and inspection activitie	28
			<u> </u>	
1	TIME TO COMPL	_ETE (HRS) MIN4	HAZARDOUS	
WTR 🗆	MAX	MIN	YES, X NO	
AREA LOCATION	PERSONNEL (H	EADCOUNT) WER2	GROUND SUPPORT EQUIPME LPS □ OTHER ☑ (SPEC	
OLF 🗆	TEST CONDUCT	TOR		
TPF 🖸	PROPULSION T	RS1 ECH	H-001, H-004, H-018,	, н-025
		HTECH		
ORB 🗆	SAFETY ENGIN	EER1		
		PPORT		
			PROCEDURES	
TUG INTERFACE: ORBITER	ACILITY OFTWARE	TUG ORIENTATION: HORIZONTAL ② VERTICAL □	P .	2 1 12 3
visually verify vertical. Posi	MP	e condition. Atta	Remove transportation th handling GSE and rota ove Tug access and inspe	ate Tug to
REMARKS:				
Hazardous due t Factory clean pr		and hoisting		
COMMODITIES/CONSU	MABLES REQUI	RED:		

FUNCTION NO:	FUNCTION TITLE:	
4.4	Receiving Inspection	
FUNCTION OBJECTIVE	:	
Visually ve	rify condition of Tug.	
SITE LOCATION	TIME TO COMPLETE (HRS)	HAZARDOUS
ETR 🖾	MAX 16 MIN 2	YES NO X
WTR □ AREA LOCATION	PERSONNEL (HEADCOUNT)	GROUND SUPPORT EQUIPMENT
OLF 🗆	TOTAL MANPOWER 6 8* 8* TEST CONDUCTOR	LPS (SPECIFY)
OPF () TPF (2)	TEST ENGINEERS 2* 2**	As required.
SPF □	PROPULSION TECH1MECH/STRU/TH TECH1	
PCR 🗆 ORB 🗆	AVIONICS TECH 1 SAFETY ENGINEER 3	
	QUAL CONT. TECH3TECHNICAL SUPPORT	
	1251111042301.0111	PROCEDURES NEW CHANGE
TUG INTERFACE:	TUG ORIENTATION:	PAGES 6 3
ORBITER □ F SPACECRAFT □ S	ACILITY	MANHOURS 36 9
SOFTWARE REQUIRE	MENTS:	
ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	MP 🖸	
OPERATIONS:		
Visual insp	ection of Tug and subsystems fo	or damage, missing hardware,
workmanship	, and general condition.	
REMARKS:		
newanko.		
COMMODITIES/CONSU	MABLES REQUIRED:	

FUNCTION NO:	FUNCTION T	TLE:			
4.5	Instal1	Ship-Loose Equipme	nt		
FUNCTION OBJECTIV	E:				
Prepare Tu	g for subsys	tems testing.			
SITE LOCATION	ТІМЕ ТО СОМРІ	ETE (HRS)	HAZARDOUS		
ETR 🕸	MAX 20		YES NO.	<u>X</u>	
WTR □ AREA LOCATION	PERSONNEL (H	EADCOUNT)	GROUND SUPPORT EQUIPM	MENT	
OLF []	TOTAL MANPO	COD	LPS [] OTHER (\$PE	ECIFY)	
OPF □ TPF 【2〕	TEST ENGINEE		As Required		
SPF 🗓 PCR 🖸	MECH/STRU/TH	TECH1			
ORB 🗆	AVIONICS TECH SAFETY ENGIN	EER			· <u></u>
	QUAL CONT. TE	CH1_2** PPORT			
			PROCEDURES	NEW	CHANGE
TUG INTERFACE:	AGULTY D	TUG ORIENTATION:	PAGES .	7	4
ORBITER D F	ACILITY DOFTWARE	HORIZONTAL □ VERTICAL 🖄	MANHOURS .	42	
SOFTWARE REQUIRE	MENTS:				
ORB ON-BOARD CO	MP 🗆				
GROUND CONTROL				,	
OPERATIONS:		· · · · · · · · · · · · · · · · · · ·			
T4-11	1 -1 - 41-1		*		
for subsyst		ly connect Tug ship	loose components and	configure	
REMARKS:				····	
HEWIAHKS:					
COMMODITIES/CONSU	MABLES REQUI	RED:			
[

FUNCTION NO:	FUNCTION TI	TLE:			
4.6	Leak Che	Leak Check Tug Pressurization System			
FUNCTION OBJECTIVE: Verify Inte		essure System			
1	TIME TO COMPL	ETE (HRS)	HAZARDOUS		
ETR 🖾 N	иАХ <u>10</u>	MIN3	YES, X NO		
OLF C	TEST ENGINEE!	WER 5 8* 8** OR 1 1* 1** RS 1	GROUND SUPPORT EQUIPMENT LPS ☑ CTHER ☑ (SPECIFY) P-002, P-009, P-011, P-01	6	
PCR D	MECH/STRU/TH AVIONICS TECH SAFETY ENGIN	ECH 2 4 * 4 * * I TECH 1			
		PPORT			
TUG INTERFACE: ORBITER □ FA SPACECRAFT □ SO	ACILITY 🗆	TUG ORIENTATION: HORIZONTAL VERTICAL	PROCEDURES NEW PAGES3 MANHOURS18	CHANGE6	
SOFTWARE REQUIREM LPS ORB ON-BOARD COM TUG ON-BOARD COM GROUND CONTROL S OTHER	1P				
pressurization access to expended to the check to the che	ion system t ssential per k all mechar , APS and fu ing remainin	to 3100 ±100 psig and sonnel, leak check nical joints. Verical cell reactant to a leak checks. Tag	ear area of personnel, pressund stabilize for 30 minutes. (decay) for 30 minutes. Soaty proper tank pressure regulanks. Retain pressure in system indicating condition	Open p/ ation tem	
REMARKS: Periodic che Hazardous be		k pressures will be ressure.	monitored by LPS.		
COMMODITIES/CONSUM Facility He		RED:			

FUNCTION NO:	FUNCTION T	ITLE:	•		
4.7	Leak Ch	eck LO ₂ Tank			
FUNCTION OBJECTIVE	E:				
Verify LO ₂	System Inte	grity			
	·				
SITE LOCATION ETR 🕸	TIME TO COMP		HAZARDOUS		
WTR	MAX	MIN3	YES X NO		
AREA LOCATION	PERSONNEL (H	IEADCOUNT) WER57*7**_	GROUND SUPPORT EQUIPM		
OLF [] OPF []	TEST CONDUC	TOR 1* 1**	LPS (X) OTHER X) (SPE	C(FY)	
TPF OX		RS <u>1</u> ECH <u>2 3* 3**</u>	P-016		
SPF □	MECH/STRU/TH	TECH	1		
PCR D	AVIONICS TECH	H			
	QUAL CONT. TI	ECH			
	TECHNICAL SU	PPORT			
TUG INTERFACE:		TUG ORIENTATION:	PROCEDURES	NEW 7	CHANGE
ORBITER - F	ACILITY D	HORIZONTAL []	PAGES _		12
SPACECRAFT D S		VERTICAL £	MANHOURS _		
SOFTWARE REQUIRED	MENTS: □				
ORB ON-BOARD CO	MP 🗍				
TUG ON-BOARD CO GROUND CONTROL					
OTHER					
OPERATIONS:					
			lear area of personnel		
			ure for 30 minutes. Ocay) tank for 30 minute		
allowable l	leakage - TBI	D psi in 30 minutes	. Soap/bubble check p	ropellant	:/
	stem mechan: indicating o		system to 19 ± 1 psia	and lock	up.
14g system	TIGICALTIE (Coudition.			
·					
REMARKS:	n-hoard Hel	ium used as das bra	ssure source. Periodi	c chacks	of
tank pressu	res will be	monitored by LPS.	Hazardous because of	pressure.	ŲĮ.
					
COMMODITIES/CONSU					
Facility He	lium require	ed if Tug Helium sp	heres are empty.		

FUNCTION NO:	FUNCTION TITLE:			
4.8	Leak Check LH, Tank			
FUNCTION OBJECTIVE:				
Verify LH ₂ S	System integ	rity.		
SITE LOCATION T	IME TO COMPL	ETE (HRS)	HAZARDOUS	
	1AX	_	YES X NO	
OLF C - OPF C - TPF C - SPF C - PCR C - ORB C -	TEST CONDUCTOR			
		ECH1 PPORT		
			PROCEDURES	NEW CHANGE
TUG INTERFACE: ORBITER D FA SPACECRAFT D SC	CILITY 🗆	TUG ORIENTATION: HORIZONTAL [] VERTICAL 🗷	PAGES MANHOURS	7 4 42 12
SOFTWARE REQUIREMENTS: LPS				
REMARKS: Remaining o tank pressu	n-board Hel re will be	ium used as gas premonitored by LPS. I	ssure source. Periodio Hazardous because of p	c checks of ressure.
COMMODITIES/CONSUMABLES REQUIRED: Facility Helium required if Tug Helium spheres are empty.				

FUNCTION NO:	FUNCTION TO	TLE:		
4.9	Leak Ch	Leak Check Fuel Cell Reactant Tanks		
FUNCTION OBJECTIVE				
Verify Reac	tant System	integrity.		
·				
1	TIME TO COMPI		HAZARDOUS	
j wta □ '		MIN2	YES. X NO.	
AREA LOCATION	PERSONNEL (H	EADCOUNT) WER6 8* 8**	GROUND SUPPORT EQUIPM	
OLF U	TEST CONDUCT	TOR1* 1**	LPS Ö OTHER 心 (SPI	ECIFY)
TPF CX	TEST ENGINEE PROPULSION T	ECH2 3* 3**	P-002	
SPF D	MECH/STRU/TH AVIONICS TECH	TECH.		
ORB 🗅	SAFETY ENGIN	EER 1		
		ECH PPORT		
			PROCEDURES	NEW CHANGE
TUG INTERFACE:	ACILITY []	TUG ORIENTATION: HORIZONTAL []	ì	8 4
SPACECRAFT - SC		VERTICAL 🗵	MANHOURS	48 12
SOFTWARE REQUIREM	IENTS:			
ORB ON-BOARD COM	VP □			
GROUND CONTROL OTHER				
OPERATIONS:	<u> </u>			
	and facili	ty Helium supply. (Clear area of personn	el, pressurize
reactant ta	nks to opera	ating pressure. Sta	abilize pressure for k check (decay) syste	30 minutes,
minutes, ma	ximum leaka	ge 3 psi in 30 minu	tes. Soap/bubble che	ck system
mechanical indicating		nt system to 19 ±1 1	osia and lock up Tug	system
Indicacing	Condition.			
<u> </u>				
]				
REMARKS:				
)	ecks of sys	tem pressure will be ressure.	e monitored by LPS.	
COMMODITIES/CONSU	MABLES REQUI	RED:		
Facility He	lium			
		······································		

FUNCTION NO:	FUNCTION TI	TLE:	
4.10	Vent Rer	maining Pressurant	
FUNCTION OBJECTIVE	:		
Safe Pressi	urization Sys	stem	
	,		
	TIME TO COMPL		HAZARDOUS YESX NO
WTR	MAX6	WIIN ±	
AREA LOCATION	PERSONNEL (HIT TOTAL MANPO)	NFR 5 7**	GROUND SUPPORT EQUIPMENT LPS (X OTHER X (SPECIFY)
OLF []	TEST CONDUCT	OR1**	P-016
TPF 🖺	PROPULSION TO	CH 2 3**	1-010
l prp □	**********	TECH	
ORB 🗆	SAFETY ENGIN	EER 1 1	
		PPORT	
TAG INTEREACE.		TUG ORIENTATION:	PROCEDURES NEW CHANGE PAGES 5 3
TUG INTERFACE: ORBITER	ACILITY 🗆	HORIZONTAL []	MANHOURS 30 9
SPACECRAFT S		VERTICAL ☑	
LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	MP 🗆		
psia and s	ecure Tag leak check	system indicating o	ssure system to maximum of 950 condition. Disconnect pressuri-
Pressuriza	cton system	sure. pressure periodica at lockup - 50 ps	lly monitored by LPS. Minimum ia.
COMMODITIES/CONSU	JMABLES REQU	IRED:	

FUNCTION NO:	FUNCTION TI	TLE:		1	
4.11	Clean T	ug & Prep to Move			
	to be compat	ible with class loce and checkout.	00,000 cleanliness	requirements	
SITE LOCATION ETR (X) WTR []	TIME TO COMPI	LETE (HRS) MIN 7	HAZARDOUS YES,	NO X	
TPF 🖾	PERSONNEL (HEADCOUNT) TOTAL MANPOWER 6 11** TEST CONDUCTOR TEST ENGINEERS 1 2** PROPULSION TECH 1 4**		н-004, н-018	(SPECIFY)	
·	OUAL CONT. TE	t 1 1 EER.			
TUG INTERFACE: ORBITER	ACILITY [] OFTWARE []	TUG ORIENTATION: HORIZONTAL [] VERTICAL 1	1	NEW AGES 9 OURS 54	CHANGE 5 15
SOFTWARE REQUIREM LPS ORB ON-BOARD COI TUG ON-BOARD COI GROUND CONTROL OTHER	MP MP				
requirement	s. Attach	aning chemical and handling equipment			
REMARKS:					
COMMODITIES/CONSU		RED:			

FUNCTION NO:	FUNCTION TI	TLE:		
4.12	Move In	to TPF Checkout Are	ea or Storage	
FUNCTION OBJECTIVE		ckout area for main	itenance and checkout	
	TEST CONDUCT TEST ENGINEE PROPULSION TI MECH/STRU/TH AVIONICS TECH SAFETY ENGIN QUAL CONT. TE	EADCOUNT) WER 4 10* 10** TOR RS 1 2* 2** ECH 4 TECH 2 5* 5** HEER 1 ECH 2 2* 2**	HAZARDOUS YES X NO GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY) H-001, H-026, H-031 (Altern	nate
THE INTERFACE.	TECHNICAL SU	PPORTTUG ORIENTATION:	PROCEDURES NEW CHA	NGE 2
TUG INTERFACE: ORBITER	ACILITY 🗆	HORIZONTAL (A) VERTICAL	MANHOURS	6
Workstands Alternate	MP	ovable platforms, a	area, install in Tug remove handling GSE. k crane to checkout area	
crane a GSE manipulator (H-031) could be utilized to transport Tug vertically from one area or stand to another.				
REMARKS; Hazardous Move to s	due to hois torage if no	ting and movement.	nt to continue in checkout.	····
COMMODITIES/CONSU	MABLES REQU	IRED:		

FUNCTION NO:	FUNCTION T	ITLE:			
4.13	Mis	sion Configure			
FUNCTION OBJECTIVE	= ·				-
Incorpo	orate missio	n peculiar modific	atíons as required		
SITE LOCATION	TIME TO COMPI		HAZARDOUS		
ETR ED WTR ()	MAX6	MIN2	YES NO	X	
AREA LOCATION OLF [] OPF [] TPF [S] SPF []	PERSONNEL (HEADCOUNT) TOTAL MANPOWER 5 TEST CONDUCTOR TEST ENGINEERS 1 PROPULSION TECH 1 MECH/STRU/TH TECH 1		as required		
PCR ORB	AVIONICS TECH	H1 IEER			
	QUAL CONT. II	CCN			
TUG INTERFACE:	TECHNICAL SU	TUG ORIENTATION:	PROCEDURES	NEW (CHANGE 3
	ACILITY D	HORIZONTAL ☐ VERTICAL 😡	MANHOURS _		9
requir	MP	ific components as figure MSS/PSS con	required by unique mis sole for assigned missi	sion on.	
REMARKS:					
		will include modificatest procedures.	ication incorporation		
COMMODITIES/CONSU	IMABLES REQUI	IRED:			

FUNCTION NO:	FUNCTION TITLE:			
4.14	Replaced Adapter Component and Modification Verification			
FUNCTION OBJECTIVE cation activity.	: Verify	system performance	after replaced component/modif	F1-
SITE LOCATION	TIME TO COMPI	LETE (HRS)	HAZARDOUS	
ETR 🛭 WTR 🗀	MAX2	MIN1	YESNOX	
AREA LOCATION OLF OPF	TEST ENGINEE	WER 5 FOR 1 RS 1	GROUND SUPPORT EQUIPMENT LPS (X) OTHER (X) (SPECIFY) H-003, A-001, A-012	
SPF PCR ORB	MECH/STRU/TH AVIONICS TECH SAFETY ENGIN	ECH 1 H TECH 1 H EER 1	Electronic Equipment	
		PPORT		
THE PEACE		THE OWENTATION.	PROCEDURES NEW	CHANGE
TUG INTERFACE: ORBITER	ACILITY DETWARE	TUG ORIENTATION: HORIZONTAL VERTICAL VERTICAL	PAGES <u>5</u> MANHOURS <u>30</u>	
replaced or syste	AP STATION STATION STATION STATION STATION STATE	1.	erfaces and operation of LRU's	
been performed.	ired only wh	nen LRU's have been	replaced or modifications have	<u>3</u>
COMMODITIES/CONSU	MABLES REQUI	RED: Facility P	ower	

FUNCTION NO:	FUNCTION TITLE:			
4.15	Prep Fo	Prep For Mate With Tug		
FUNCTION OBJECTIVE		e adapter for Tug n	ate	
SITE LOCATION 1	TIME TO COMPL	LETE (HRS)	HAZARDOUS	
ETR 🖾 WTR 🗀	MAX3	MIN2	YESXNO	
AREA LOCATION OLF OPF TPF XD SPF PCR	PERSONNEL (HEADCOUNT) TOTAL MANPOWER 4 TEST CONDUCTOR TEST ENGINEERS 1 PROPULSION TECH 2 AVIONICS TECH 2 SAFETY ENGINEER 1		GROUND SUPPORT EQUIPMENT LPS □ OTHER S (SPECIFY)H-018, H-003	
(QUAL CONT. TE	CH		
	TECHNICAL SU	PPORT	22225	
TUG INTERFACE: ORBITER	CILITY 🗆	TUG ORIENTATION: HORIZONTAL ☐ VERTICAL Ø	PROCEDURES NEW CHANGE PAGES 4 2 MANHOURS 24 6	
SOFTWARE REQUIREM LPS ORB ON-BOARD COM TUG ON-BOARD COM GROUND CONTROL S OTHER OPERATIONS: Disco or to pallet for	P	cout GSE, attach ha	ndling GSE. Hove to Tug for mate	
REMARKS:				
Hazardous due	≥ to movemer	nt and hoisting		
COMMODITIES/CONSUM	ABLES REQUI	RED. N/A		

FUNCTION NO:	FUNCTION TI	TLE:	
4.16	Mate Tu	ug with Adapter & Ve	erify Mechanical Interface
FUNCTION OBJECTIVE electrical inter	Mate Ti	ug with adapter and	verify mechanical and
SITE LOCATION	TIME TO COMPL	LETE (HRS)	HAZARDOUS
ETR 020 WTR ()	MAX <u>32</u>	MIN4	YESXNO
AREA LOCATION OLF OPF TPF CX SPF PCR ORB ORB	TEST CONDUCT TEST ENGINEE PROPULSION T MECH/STRU/TH	WER 8 9* 13** FOR 1* 1** RS 1 2* 2** ECH 1 2** H TECH 3 H 1 2** EER 1	GROUND SUPPORT EQUIPMENT LPS OTHER RD (SPECIFY) P-011, P-016, P-001, A-017, A-001 Electronic Equipment
	TECHNICAL SU	PPORT	
THE ANTE OF LOS	Writer	· · · · · · · · · · · · · · · · · · ·	PROCEDURES NEW CHANGE
		TUG ORIENTATION: HORIZONTAL (1) VERTICAL (2)	PAGES
ORBITER SOFTWARE WENTICAL SOFTWARE WENTICAL SOFTWARE REQUIREMENTS: LPS GRON-BOARD COMP GROUND CONTROL STATION GROUND CONTROL STATION GROUND CONTROL STATION GOTHER OPERATIONS: Position adapter for mating with Tug, move Tug Workstand platforms to accommodate adapter, mate and verify all docking latches latched, verify dynamic envelope (clearance) about engine. Mate pressurization interfaces and leak check. Mate electrical system interfaces and verify continuity. Mate propellant systems interfaces and Leak check.			
REMARKS:	. J., Led.	ating oppustions	
Hazardous	due to hois	sting operations.	
COMMODITIES/CONSU	MABLES REQUI	RED: Facility Powe	er, Helium

FUNCTION NO:	FUNCTION TI	ITLE:		
4.17	Electric	cal Pre-Power Check	·s	į
FUNCTION OBJECTIVE	E:			
Verify	Tug ready fo	or power-up and sys	stems testing	
SITE LOCATION ETR 126 WTR (1)	TIME TO COMPI	LETE (HRS) MIN1.5	HAZARDOUS YESNOX	
AREA LOCATION OLF OPF TPF SI SPF PCR ORB ORB	PERSONNEL (HEADCOUNT) TOTAL MANPOWER 5 8* 8** TEST CONDUCTOR 1 TEST ENGINEERS 1 2* 1** PROPULSION TECH MECH 2 4* 4** SAFETY ENGINEER OUAL CONT. TECH 1 2* 2** TECHNICAL SUPPORT		GROUND SUPPORT EQUIPMENT LPS (MODELLE CONTINUE OF CONT	
			PROCEDURES NEW	CHANGE
TUG INTERFACE: ORBITER D F SPACECRAFT D S	ACILITY 🗆		PAGES 3 MANHOURS 18	1
LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROI OTHER OPERATIONS: Verify	OMP	t ground, connect	GSE and verify bus isolation	
REMARKS:		IRED:		
1	JMABLES REQUI	IRED:		

FUNCTION NO:	FUNCTION TITLE:		
4.18	Mechanical Alignment Verification		
FUNCTION OBJECTIVE:			
Verify r S/C adap	mechanical alignment of engi pter to Tug and guidance com	ne to Tug, deployment adapter to Tug, ponent platform to Tug	
SITE LOCATION T	TIME TO COMPLETE (HRS)	HAZARDOUS.	
ETR 🖾 🔥 WTR 🖸	MAX MIN 4	YES,NOx	
OLF D T	PERSONNEL (HEADCOUNT) TOTAL MANPOWER 6 7** TEST CONDUCTOR 1 TEST ENGINEERS 1 PROPULSION TECH 1 MECH/STRU/TH TECH 1 AVIONICS TECH 1 SAFETY ENGINEER 1 QUAL CONT. TECH 1 2**	P-006, P-008	
	TECHNICAL SUPPORT		
		PROCEDURES NEW CHANGE	
TUG INTERFACE: ORBITER	TUG ORIENTATION: ACILITY HORIZONTAL _	PAGES 8 4	
SPACECRAFT SO		MANHOURS 48 12 12	
SOFTWARE REQUIREM LPS ORB ON-BOARD COM TUG ON-BOARD COM GROUND CONTROL S OTHER	12 AP () AP ()		
Where engine change has not been done verify engine alignment has not shifted using scribed alignment markings. Verify alignment of the deployment adapter and spacecraft adapter to Tug using appropriate mechanical markings. Verify the alignment of the GWN component platform with the Tug axis mechanically.			
REMARKS:			
COMMODITIES/CONSUM	MABLES REQUIRED:		

FUNCTION NO:	FUNCTION T	TLE:			
4.19	Арр	Apply Power to Tug			
FUNCTION OBJECTIVE	:				
Energiz	e Tug subsys	tems for downstream	testing and verify p	ower quality.	
OLTE LOCATION	TIME TO COMPI	ETT (HOC)	HAZARDOUS		
ETR 쉾	MAX20		YESNO	<u> </u>	
WTR ☐ AREA LOCATION			GROUND SUPPORT EQUIP		
OLF	PERSONNEL (H	WER 6 8* 12**	LPS 10 OTHER (SP		
OPF []	TEST CONDUCT	FOR* RS1 2* 3**	A-001, A-003, A-	008	
TPF 10	PROPULSION T MECH/STRU/TH	ECH			
PCR 🗆	AVIONICS TECH	4 <u>3 4* 5**</u>			
		EER			
	TECHNICAL SU	PPORT	PROCEDURES	NEW CHANGE	
TUG INTERFACE:		TUG ORIENTATION:	1	4 2	
ORBITER	ACILITY [] OFTWARE []	HORIZONTAL 🗓 VERTICAL 🛣	MANHOURS	6	
SOFTWARE REQUIRE					
LPS ORB ON-BOARD CO					
TUG ON-BOARD CO GROUND CONTROL					
OTHER					
OPERATIONS:					
With gr	ound power a	ipplied to the Tug,	utilize the LPS to s	witch on/off	
			bus for noise and rip a. Verify Tug/spaced		
	stributions.			-	
				İ	
				,	
<u> </u>					
	······································				
REMARKS:					
COMMODITIES/CONSU	MABLES REQUI	RED:			
Facil	ity power				
			······································		

FUNCTION NO:	FUNCTION TITLE:				
4.20	Loa	Load PCM Data Format			
FUNCTION OBJECTIVE:					
Load Tug onb	ooard compu	ter with mission pe	culiar data format		
SITE LOCATION T	IME TO COMP	ME TO COMPLETE (HRS) HAZARDOUS			
) WIRI:	1AX <u>4</u>		YES,NO_	X	
OLF	PERSONNEL (HEADCOUNT) TOTAL MANPOWER 4 TEST CONDUCTOR TEST ENGINEERS 1 PROPULSION TECH MECH/STRU/TH TECH 2 AVIONICS TECH 2		GROUND SUPPORT EQUIPM LPS OTHER & (SPE		
	DUAL CONT. TE	EER			
	ECHINICAL 30	rron1	PROCEDURES	NEW	CHANGE
		TUG ORIENTATION: HORIZONTAL ☐ VERTICAL ☑	PAGES	5	· · · · · · · · · · · · · · · · · · ·
REMARKS:					
COMMODITIES/CONSUMABLES REQUIRED: Facility power					

FUNCTION NO:	FUNCTION TI	TLE:			
4.21	Meas	surement System End	-to-End Calibr	ration	
FUNCTION OBJECTIVE:					
	- 16-				
Calibrat	e Measuremer	t System			
1 1	TIME TO COMPL		HAZARDOUS		
ETR 52 WTR []	MAX8	MIN2	YES.	NO <u>x</u>	
AREA LOCATION	PERSONNEL (H		GROUND SUPPO		
OLF []	TOTAL MANPO	WER 7 8** OR 1	LPS 🔀 OTH	ER 쉾 (SPEC(FY)	
OPF LI	TEST ENGINEE	RS1	A-010, A	A-013, A-008	
SPF 🗆	MECH/STRU/TE	ECH 1 H TECH 1			•
	AVIONICS TECH SAFETY ENGIN	H			
		ECH			
			PROCEDURES	NEW	CHANGE
TUG INTERFACE:		TUG ORIENTATION:		PAGES25	13
ORBITER C F SPACECRAFT C S	ACILITY D OFTWARE D	HORIZONTAL □ VERTICAL ᡚ	MA	NHOURS150	40
SOFTWARE REQUIREM					,
LPS ORB ON-BOARD CO					
TUG ON-BOARD CO! GROUND CONTROL					
OTHER		3 point step calibr	ation		<u> </u>
OPERATIONS:					
III-ilina	the TDC/mu	g computers to stim			j
		inimum of three vol		truments for a	ı
					; ;
REMARKS:					
COMMODITIES/CONSU	IMABLES REQU	RED:		<u> </u>	
 Facilit	y power				
	<u> </u>				

FUNCTION NO:	FUNCTION TITLE:				
4.22	Replaced Component and Mod	ification Verification			
FUNCTION OBJECTIVE	FUNCTION OBJECTIVE:				
Verify system performance after replaced component/modification activity					
i	TIME TO COMPLETE (HRS) MAX 48 MIN 3	HAZARDOUS YES, NO x			
OLF	PERSONNEL (HEADCOUNT) TOTAL MANPOWER 8 12* 20*** TEST CONDUCTOR 1 3*** PROPULSION TECH 1 3* 5***	GROUND SUPPORT EQUIPMENT LPS □ OTHER 包 (SPECIFY) as required by systems			
PCR 🗆	MECH/STRU/TH TECH 1 2** AVIONICS TECH 2 3* 6** SAFETY ENGINEER	disturbed			
l	QUAL CONT. TECH 1 2* 3** TECHNICAL SUPPORT	PROCEDURES NEW CHANGE			
TUG INTERFACE: ORBITER ☐ F SPACECRAFT ☐ S	TUG ORIENTATION: ACILITY HORIZONTAL CONTACT VERTICAL SE	PAGES <u>8 4</u> MANHOURS <u>48 12</u>			
LPS ORB ON-BOARD CO TUG ON-BOARD CO	SOFTWARE REQUIREMENTS: LPS ORB ON-BOARD COMP TUG ON-BOARD COMP GROUND CONTROL STATION				
OPERATIONS:					
	t applicable GSE, verify interf tems modified, i.e.,	aces and operation of LRUs replaced			
Purge Propel Pressur APS Le Hydrau T.C.S. Commun	Purge System Leak Check Purge Bay Leak Check Propellant System Leak Check Pressurization System Leak Check APS Leak and Functional Check Hydraulic System Checkout T.C.S. Checkout Communications System Checkout AESPA Checkout T.V. System Checkout Rendezvous and Docking System Checkout Flight Control System Checkout Power and Distr. Systems Checkout Measurement System Checkout Measurement System Checkout AESPA Checkout				
REMARKS:					
Require	Required only when LRUs have been replaced or modifications have been performed. Modification instructions will include retest procedures.				
COMMODITIES/CONSU	IMABLES REQUIRED:				
Facili	ty Power, Helium				

FUNCTION NO:	FUNCTION TI	FUNCTION TITLE:		
4.23	Post-Main	Post-Maintenance MLI Purge		
FUNCTION OBJECTIVE				
Dry ML	I & Purge Ba	g		
SITE LOCATION	TIME TO COMPL	ETE (HRS)	HAZARDOUS	
ETR DS WTR DS	MAX8	MIN3	YESNOX	
AREA LOCATION	PERSONNEL (H	EADCOUNT)	GROUND SUPPORT EQUIPMENT	
OLF [TOTAL MANPO	WER4	LPS 3 OTHER (SPECIFY)	
OPF []	TEST ENGINEE	RS	P-009, P-020	
TPF KE SPF D		ECH2		
PCR 🗆	AVIONICS TECH	1		
ORB 🗆	SAFETY ENGIN	EER		
		PPORT		
			PROCEDURES NEW CHANGE	
TUG INTERFACE:		TUG ORIENTATION:	PAGES 2 1	
ORBITER D F	SOFTWARE []	HORIZONTAL [^ VERTICAL	MANHOURS 3	
SOFTWARE REQUIRED LPS ORB ON-BOARD CO TUG ON-BOARD CO	MP 🗆			
GROUND CONTROL OTHER				
OPERATIONS:	<u></u>			
Hook u	p GSE, initi	ate warm No purge	for 2.5 hours to dry MLI.	
Termin.	ate hot purg	e and connéct slow	H purge to maintain insulation	
dry.	Verity suffic	cient helium in ad	apter helium sphere to support	
Parso				
REMARKS:				
To be	accomplished et temperatu	if purge bag open re nominal 580 R (1	ed up during maintenance cycle. 20°F)	
-				
COMMODITIES/CONSU		RED:		
Facili	ty N_2 and H_e			

FUNCTION NO:	FUNCTION TITLE:				
4.24	Dry Tug Propellant Tanks				
FUNCTION OBJECTIVE:					
Dry new Tug pro	opellant ta	nks to be compatib	te with cryogeni	ics	, ,
SITE LOCATION T	IME TO COMPL	ETE (HRS)	HAZARDOUS		
ETR XD N	//AX6	MIN3	YES	NOx	
OLF	PERSONNEL (HEADCOUNT) TOTAL MANPOWER 4 7** TEST CONDUC. JR TEST ENGINEERS 1 2** PROPULSION TECH 2 4** MECH/STRU/TH TECH AVIONICS TECH SAFETY ENGINEER 0 QUAL CONT. TECH 1		GROUND SUPPORT LPS & OTHER P-016		
		ECH			
		FFORT	PROCEDURES	NEW	CHANGE
TUG INTERFACE: ORBITER	CILITY 🗆	TUG ORIENTATION: HORIZONTAL ☐ VERTICAL 🖺	MAN	PAGES4 IHOURS24	<u>2</u> <u>6</u>
SOFTWARE REQUIREMENTS: LPS					
REMARKS: Accomplish on each new Tug or if propellant tank entered during recycle operations. Periodic check of tank pressure will be monitored by LPS.					
COMMODITIES/CONSUM	MABLES REQUI	RED:			
	GНе			,	

FUNCTION NO:	FUNCTION TI	TLE:			
4.25	Mate Tug with Kick Stage				
FUNCTION OBJECTIVE	:				
Mate Tug with Kick Stage Mechanically and Electrically					
SITE LOCATION T	TIME TO COMPL	ETE (HRS)	HAZARDOUS		
ETR DS WTR []	MAX <u>8</u> XAN	MIN2	YES, x NO_		
OLF	PERSONNEL (HEADCOUNT) TOTAL MANPOWER 6 9* 9** TEST CONDUCTOR TEST ENGINEERS 1 2* 2** PROPULSION TECH MECH/STRU/TH TECH_2 AVIONICS TECH 1 2* 2** SAFETY ENGINEER 1 QUAL CONT. TECH 1 2* 2**		GROUND SUPPORT EQUIPME LPS: OTHER © (SPEC	IFY)	
		PPORT			
			PROCEDURES	NEW	CHANGE
TUG INTERFACE: ORBITER	ACILITY 3	TUG ORIENTATION: HORIZONTAL [] VERTICAL []	PAGES MANHOURS	5 30	1
SOFTWARE REQUIREMENTS: LPS					
REMARKS:					
Hazardou	Hazardous due to hoisting operations				
COMMODITIES/CONSUM	MABLES REQUI	RED:			

A-74

FUNCTION NO:	FUNCTION T	FUNCTION TITLE:			
4.26	Verify 1	Verify Interfaces and Prepare for SHE			
FUNCTION OBJECTIVE Verify sign power activ	al continuit	ty across Tug/kick a	tage interface and kick stage		
ETR &	TIME TO COMPI		HAZARDOUS YESXNO		
AREA LOCATION OLF CPF TPF SPF PCR ORB	7 0.0 0.0 1				
TUG INTERFACE:	TECHNICAL SU	TUG ORIENTATION:	PROCEDURES NEW PAGES 5	CHANGE 3	
ORBITER □ F SPACECRAFT □ S	ACILITY OFTWARE	HORIZONTAL [VERTICAL ☑	MANHOURS <u>30</u>	9	
í -	MP	•	oower distribution. Utilize s stage interface and verify		
REMARKS: Hazardous d ordnance ci			g will be required for		
COMMODITIES/CONSO	WIADLES RECOU	neu.			

FUNCTION NO:	FUNCTION T	FUNCTION TITLE:			
4.27	Load and	Load and Verify Computer Software			
FUNCTION OBJECTIVE	:				
Load Tu	g computer w	with Test Software			
SITE LOCATION	TIME TO COMPI	LETE (HRS)	HAZARDOUS		<u> </u>
l	MAX <u>2</u>	MIN	YESNO_	x	
AREA LOCATION	PERSONNEL (H	EADCOUNT)	GROUND SUPPORT EQUIPM		
OLF LI	TEST CONDUCT	WER <u>2 3**</u> FOR	LPS 🛱 OTHER 🗆 (SPE	ECIFY)	
OPF 🗆	TEST ENGINEE	RS1	A-009, A-008	····	
i i		ECH			-
		H TECH1 2**			
l I		EER			
		PPORT			
			PROCEDURES	NEW	CHANGE
TUG INTERFACE:	ACILITY 🗆	TUG ORIENTATION: HORIZONTAL []		5	3
ORBITER DF. SPACECRAFT DS		VERTICAL EX	MANHOURS .	30	9
SOFTWARE REQUIREN	MENTS:				— <u>, </u>
LPS OR BON-BOARD COI	WP □				
TUG ON-BOARD COI	VIP 🛣				
GROUND CONTROL OTHER	STATION []				
OPERATIONS:		***************************************			
 Utilize	the LPS to	load the Tue compr	ter with mission pecu	liar test	
softwar		road che rug compe	itel with mission pecu.	TTGI COOL	,
•					
					;
REMARKS:					
COMMODITIES/CONSU	MABLES REQUI	RED:	**************************************		

FUNCTION NO:	FUNCTION TI	FUNCTION TITLE:			
4.28	Systems	Systems Health Evaluation (SHE)			
Verify Tug	FUNCTION OBJECTIVE: Verify Tug subsystem performance is in accordance with established go/no-go criteria				
SITE LOCATION ETR D WTR 20	TIME TO COMPI MAX32		HAZARDOUS YESxNO		
AREA LOCATION OLF □ OPF □ TPF 図	PERSONNEL (H TOTAL MANPO TEST CONDUCT TEST ENGINEE	WER 12 13**	GROUND SUPPORT EQUIPMENT LPS (SPECIFY A-001,)	
SPF 🗆 PCR 🗆 ORB 🔾	MECH/STRU/TH AVIONICS TECH SAFETY ENGIN	TECH1 	A-016		
TUG INTERFACE:	TECHNICAL SU Tech Writer	TUG ORIENTATION:	PROCEDURES NE		
ORBITER D F	SOFTWARE	HORIZONTAL 다 VERTICAL 및	MANHOURS <u>15</u>		
SOFTWARE REQUIRED LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	IMP 🖂				
OPERATIONS: With the Tug or Tug/kick stage in a simulated flight posture, ordnance function monitored via special cabling, command the Tug/kick stage through the normal mode of operation. All commandable backup/redundancy modes will be exercised. All time critical sequences will be verified. Selected data points will be monitored to compare with pre-established trend data.					
REMARKS: Hazardous o	nly when ord	nance is installed.			
COMMODITIES/CONSU	JMABLES REQUI	RED:			

FUNCTION NO:	FUNCTION T	TLE:			
4.29	Install Ordnance				
FUNCTION OBJECTIVE	:				
Install Flig	ht Ordnance				
1	ne oranginge				
l l	TIME TO COMPI		HAZARDOUS		
WTR 🔂		MIN_2	YESxNO_		
AREA LOCATION	PERSONNEL (H	EADCOUNT) 8 9**	GROUND SUPPORT EQUIPM LPS □ OTHER ₺ (SPE		
OLF OPF	TEST CONDUCT	WER 8 9 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7			
TPF 🖸	DOMDLII CIMN T	RS <u>1</u> ECH <u>3</u>	Electronic equipme	<u>nt</u>	
		H TECH		 	······································
ORB [SAFETY ENGIN	EER 1 2**			
	TECHNICAL SU	PPORT		····	
		THE ODIENTATION.	PROCEDURES	NEW	CHANGE
TUG INTERFACE: ORBITER	ACILITY []	TUG ORIENTATION: HORIZONTAL VERTICAL	PAGES . MANHOURS .	12	
SOFTWARE REQUIREN		<u> </u>			
LPS ORB ON-BOARD COI TUG ON-BOARD COI GROUND CONTROL OTHER	MP 🗍				
OPERATIONS:					
Manhanda a 11-	· imperall Tex	a andronea . Varify	y shielding caps in pla		
			e and verify safety pi		ice.
Ordnance sim	nulators wil	1 be used for Tug	engineering model chec	kout.	
·					
REMARKS:					
COMMODITIES/CONSU	MABLES REQU	IRED:			

FUNCTION NO: 4.30	FUNCTION TITLE: Unload Kick Stage & Ship Loose Hardware			
FUNCTION OBJECTIVE	_ <u></u> E:		,	
Safety unl	oad kick sta	ge from Transport	Aircraft	
1	тіме то сомрі	•	HAZARDOUS	
ETR XD WTR:	MAX	MIN3	YESX NO	
AREA LOCATION OLF ☼ OPF □	PERSONNEL (HEADCOUNT) TOTAL MANPOWER 2 TEST CONDUCTOR 1 TEST ENGINEERS 1		GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY) H-028, H-010	
TPF □ SPF □	PROPULSION TO	ECH	11-020, 11-010	
I I		1EER1		
	QUAL CONT. TE	CH		
	TECHNICAL SU	PPORT	PROCEDURES NEW CHANGE	
TUG INTERFACE:		TUG ORIENTATION:	PAGES 2 1	
ORBITER □ F SPACECRAFT □ S	ACILITY OFTWARE	HORIZONTAL □ VERTICAL 🏠	MANHOURS 12 3	
SOFTWARE REQUIRED LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	MP			
prime move	r, and remov	e stage from aircr	er tie downs, extend wheels, attach aft via ramps.	
Hazardous	due to movem	ent.		
COMMODITIES/CONSU	MABLES REQUI	RED:		

FUNCTION NO:	FUNCTION TI	TLE:	1		
4.31	Move to	Move to Tug Processing Facility Airlock			
FUNCTION OBJECTIV Move kick		airlock for recei	ving inspection.		
SPACECRAFT DS SOFTWARE REQUIRED LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER OPERATIONS: Using the airlock.	TEST CONDUCT TEST ENGINEE PROPULSION TO MECH/STRU/TH AVIONICS TECH SAFETY ENGIN QUAL CONT. TO TECHNICAL SUI SOFTWARE MENTS: DMP STATION Prime Mover,	EADCOUNT) WER 2 FOR RS 1 ECH I TECH EER 1 ECH PPORT TUG ORIENTATION: HORIZONTAL VERTICAL tow the kick stage port cover, and pos	HAZARDOUS YES X NO GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY) GFE Equipment, H-028, I PROCEDURES NEW PAGES 2 MANHOURS 12 e in its Transtainer to the TPF sition portable workstands as	CHANGE 1 3	
REMARKS: Hazardous l		ransportation.			

FUNCTION NO:	FUNCTION TO	ITLE:				
4.31A	Move to T	Move to Tug Processing Facility				
FUNCTION OBJECTIVE	E:					
Move kick stag	e to TPF for	receiving inspect	ion.			
SITE LOCATION	TIME TO COMPL	LETE (HRS)	HAZARDOUS			
ETR &		MIN_2	YES X NO			
AREA LOCATION OLF OPF TPF SPF PCR ORB Transportation	PERSONNEL (HEADCOUNT) TOTAL MANPOWER 2 TEST CONDUCTOR TEST ENGINEERS 1 PROPULSION TECH MECH/STRU/TH TECH RB C SAFETY ENGINEER 1		GROUND SUPPORT EQUIPMENT LPS □ THER 图 (SPECIFY) GFE Equipment, N-028, H-026			
	LUML GUNI, IE	PPORT				
			PROCEDURES NEW	CHANGE		
TUG INTERFACE:		TUG ORIENTATION:	PAGES	1		
ORBITER	ACILITY [] OFTWARE []	HORIZONTAL VERTICAL F	MANHOURS12	3		
SOFTWARE REQUIRED LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER OPERATIONS: Using the Prime Remove transpo Remove prime me	MP	the kick stage in d position portable	its Transtainer to the TPF. workstands as required.			
REMARKS: 						
Hazardous becau	ise of trans	portation. Factor	y clean processing.			
COMMODITIES/CONSU	MABLES REQUI	RED:				

FUNCTION NO:	FUNCTION TI	TLE:			
4.32	Receivi	ng Inspection			
FUNCTION OBJECTIVE	 <u>=</u> :				
 Visually ve	erify condit	ion of Kick Stage			
	-	J			
SITE LOCATION	TIME TO COMPL	FTE (HRS)	HAZARDOUS		
ETR (X) WTR	MAX <u>8</u>	MIN4	YESNO	Х	
AREA LOCATION	PERSONNEL (H TOTAL MANPO	EADCOUNT) WER 5	GROUND SUPPORT EQUIPME LPS □ OTHER ☑ (SPEC		
OLF [] OPF []	TEST CONDUCT	OR	_		
TPF 🖺	PROPULSION T	RS ECH1	H	-026	
SPF □ PCR □	MECH/STRU/TH	HTECH1 H1			
ORB □		EER			
		ECH2 PPORT			
	- EOINIOME 30	.,	PROCEDURES	NEW	CHANGE
TUG INTERFACE:		TUG ORIENTATION:	PAGES	,	2
	ACILITY COFTWARE	HORIZONTAL VERTICAL X	MANHOURS	0.4	6
SOFTWARE REQUIRE					
LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	MP 🗀				
OPERATIONS:					
Visual ins hardware,	pection of K workmanship,	ick Stage and subs	ystem for damage, missintion.	ng	
COMMODITIES/CONSU	JMABLES REQU	IRED:			

FUNCTION NO:	FUNCTION T	ITLE:			
4.33	Clean K	ick Stage			
FUNCTION OBJECTIV	 E:			·	
Clean Kick requiremen	Stage to be	compatible with c	lass 100,000 cleanlines	3 S	
SITE LOCATION	TIME TO COMP	LETE (HRS)	HAZARDOUS		
ETR 🗗 WIR 🗆	MAX9	MIN5	YES NO	X	
AREA LOCATION OLF OPF TPF SO SPF OPCR TEST CONDUCTEST ENGINEE PROPULSION T MECH/STRU/TH AVIONICS TEC	WER 6 FOR 1 ECH 1 H TECH 2	GROUND SUPPORT EQUIPM LPS 口 OTHER 图 (SPE H-018, H-026			
ORB 🗆	SAFETY ENGIN	EER1			
		PPORT	PROCEDURES	NEW	CHANGE
TUG INTERFACE: ORBITER F	ACILITY 🗆	TUG ORIENTATION: HORIZONTAL		3	2
SPACECRAFT S		VERTICAL 🔯	MANHOURS _	18	6
SOFTWARE REQUIRED LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	MP 🗆				
ness requi	Kick Stage w rements. At	ith cleaning chemitach handling equi	cal and vacuum to meet pment.	cleanli-	
REMARKS:	,				
				· · · <u>/ · · · · · · · · · · · · · · · ·</u>	
COMMODITIES/CONSU	MABLES REQUI	RED:			

FUNCTION NO:	FUNCTION TI	TLE:			
4.34	Unload Kick Stage Motor, Move to TPF Airlock				
FUNCTION OBJECTIVE Safely unl		d move to airlock.			
ETR 🖾	TIME TO COMPI MAX		HAZARDOUS YES, X NO		
WTR AREA LOCATION PERSONNEL (HEADCOUNT) TOTAL MANPOWER 4 TEST CONDUCTOR 5 OPF 1 TEST ENGINEERS 1 TPF 8 PROPULSION TECH 5 PCR 1 AVIONICS TECH 2 AVIONICS TECH 5		GROUND SUPPORT EQUIPM LPS OTHER (SPE H-011, H-026,	ECIFY)		
ORB Transportation	QUAL CONT. TO	EER1			
	TECHNICAL SU	PPORT	PROCEDURES	NEW CHANGE	
TUG INTERFACE: ORBITER D F SPACECRAFT D S	ACILITY [] OFTWARE []	TUG ORIENTATION: HORIZONTAL ☐ VERTICAL ᡚ	PAGES . MANHOURS .	<u>4</u> <u>2</u> <u>5</u>	
SOFTWARE REQUIRED LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	☐ MP ☐ MP ☐		*** * **		
motor trans airlock, re	sportation,	deliver motor to T ortation cover and	ttach prime mover for p PF dock. Move motor i position portable wor	nto TPF	
REMARKS:					
Hazardous	because of t	ransportation.			
COMMODITIES/CONSU	MABLES REQUI	RED:	, , , , , , , , , , , , , , , , , , ,		

如果,我们就是一个人的,我们就是一个人的,我们就是一个人的,我们就是一个人的,我们就是一个人的,我们也是一个人的,我们也是一个人的,我们也会会会会会会会会会会会 第一个人的,我们也不是一个人的,我们也不是一个人的,我们就是一个人的,我们就是一个人的,我们就是一个人的,我们就是一个人的,我们就是一个人的,我们就是一个人的,

FUNCTION NO:	FUNCTION TITLE:	
4.35	Receiving Inspection	
FUNCTION OBJECTIVE	E:	
Visually v	erify condition of Kick Stage M	fotor.
SITE LOCATION ETR 🖾	TIME TO COMPLETE (HRS)	HAZARDOUS
WTR	MAX2 MIN1	YESNOX
AREA LOCATION	PERSONNEL (HEADCOUNT) TOTAL MANPOWER4	GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY)
OLF OPF	TEST CONDUCTOR	
TPF ☑ SPF □	PROPULSION TECH 1 MECH/STRU/TH TECH	н-026, н-023
PCR □ ORB □	AVIONICS TECH	
	SAFETY ENGINEER2	
	TECHNICAL SUPPORT	PROCEDURES NEW CHANGE
TUG INTERFACE:	TUG ORIENTATION:	PAGES 3 2
ORBITER	FACILITY [] HORIZONTAL [] SOFTWARE [] VERTICAL 2	MANHOURS 18 6
SOFTWARE REQUIRE	<u> </u>	
LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL	MP 🗍	
OTHER		
OPERATIONS:		
•	pection of motor for damage, mi Inspect shipping recorder dat	- -
damage.		
REMARKS:		
newanks.		
COMMODITIES/CONSL	IMABLES REQUIRED:	

FUNCTION NO:	FUNCTION TI	TLE:				
4.36	Clean K	Clean Kick Stage Motor				
FUNCTION OBJECTIVE:						
Clean motor	to be compa	atible with class	100,000 cleanliness ro	equiremen	ts.	
1	ME TO COMPL	ETE (HRS)	HAZARDOUS			
ETR (X) WTR ()	/AX	MIN3	YES, NO	X		
OLF [] OPF [] TPF [X] SPF [] PCR [] ORB []	ATION PERSONNEL (HEADCOUNT) TOTAL MANPOWER 6 TEST CONDUCTOR 1 PROPULSION TECH 2 MECH/STRU/TH TECH 1 AVIONICS TECH 1 SAFETY ENGINEER		GROUND SUPPORT EQUIP LPS [] OTHER (SP H-018, H-026			
 c	DUAL CONT. TE	CH				
	ECHNICAL SUI	1001	PROCEDURES	NEW	CHANGE	
TUG INTERFACE: ORBITER	CILITY -	TUG ORIENTATION: HORIZONTAL VERTICAL		2 12		
	IP		ium to meet class 100 ng equipment for hois			
REMARKS:						
COMMODITIES/CONSUM	IABLES REQUI	RED:				

FUNCTION NO:	FUNCTION T	ITLE:			
4.37	Move into Checkout Area				
FUNCTION OBJECTIV	/E:				
Move Kick	Stage into c	lean C/O area and	install in fixture.		
		area of b area and	inotali in liature.		
SITE LOCATION ETR 🗗	TIME TO COMP		HAZARDOUŞ		
WTR	MAX5	MIN	YESX NO		
AREA LOCATION	PERSONNEL (H	EADCOUNT)	GROUND SUPPORT EQUIPMEN		
OLF []	TEST CONDUCT	WER2	LPS C OTHER 图 (SPECIF	' Y)	
OPF [] TPF [2]	TEST ENGINEE	rorl	н-018, н-012		
SPF []		ECH			
PCR □		H TECH			
ORB 🗆		HIEER1			
· · · · · · · · · · · · · · · · · · ·		PPORT			
	TECHNICAL SU	PPORT		<u> </u>	
THE INTERESE.		THE OBJENITATION.		IEW CHANGE	
TUG INTERFACE: ORBITER	FACILITY [TUGORIENTATION:	PAGES	2 1	
SPACECRAFT 🗆			MANHOURS	12 3	
ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTRO OTHER OPERATIONS: Hoist Kick on buildup	DMP	transtainer and mo t fixture.	ve into checkout area and	install	
REMARKS:			The state of the s	******	
Hazardous	due to movem	ent.			
COMMODITIES/CONSL	JMABLES REQUI	RED:			

FUNCTION NO:	FUNCTION TI	ITLE:				
4.38	Install	Install Ship Loose Components				
FUNCTION OBJECTIVE	= :					
Build up s	tage					
SITE LOCATION	TIME TO COMPL	LETE (HRS)	HAZARDOUS			
ا تحا		MIN8	YES NO	X		
AREA LOCATION	PERSONNEL (H		GROUND SUPPORT EQUIP			
OLF []	TOTAL MANPO	TOR	LPS 🗆 OTHER 🖄 (SF	'ECIFY)		
OPF □ TPF 🖄	TEST ENGINEES PROPULSION TO	RS 2 ECH 1	As required.			
SPF □	MECH/STRU/TH AVIONICS TECH	1 TECH				
ORB []	SAFETY ENGIN	EER				
		PPORT				
			PROCEDURES	NEW	CHANGE	
TUG INTERFACE: ORBITER F	ACILITY []	TUG ORIENTATION: HORIZONTAL	į.	6 36	9	
SPACECRAFT S SOFTWARE REQUIRED	4	VERTICAL X	MANHOURS			
LPS ORB ON-BOARD COI TUG ON-BOARD COI GROUND CONTROL OTHER	MP					
OPERATIONS: Install and less motor	d connect th	e kick stage ship l	oose components into	a complete	: stage	
REMARKS:						
ngazino.						
COMMODITIES/CONSU	MABLES REQUI	RED:				

FUNCTION NO:	FUNCTION TI	TLE:			
4.39	Power & Distribution System Checkout				
FUNCTION OBJECTIV	L E:				
Verify pro	per power an	d power distributi	on		
, , , , , , , , , , , , , , , , , , , ,					
SITE LOCATION	TIME TO COMPL		HAZARDOUS		
ETR DX WTR	MAX	MIN6	YESNO	X	
AREA LOCATION	PERSONNEL (H	EADCOUNT)	GROUND SUPPORT EQUIPM		
OLF 🗆	TEST CONDUCT	WER6 FOR1	LPS (X OTHER (A) (SPE	CIFY)	
OPF □ TPF [K]	TEST ENGINEE	RS1	A-001, A-002, A-00	03	
SPF 🖸	MECH/STRU/TH	ECH1 H TECH2			
PCR □ ORB □	AVIONICS TECH	H2			
	QUAL CONT. TI	H JEER ECH1			
		PPORT			
	<u> </u>		PROCEDURES	NEW	CHANGE 3
TUG INTERFACE:	FACILITY [TUG ORIENTATION: HORIZONTAL		5	
SPACECRAFT D		VERTICAL IX	MANHOURS _	30	9
SOFTWARE REQUIRE LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTRO OTHER	OMP OMP				
OPERATIONS: Connect che distributioneration.	ion and regul	apply ground power	to buses. Verify pow nctional system and ver	er ify	
REMARKS:					
COMMODITIES/CONS	UMABLES REQU	IRED:			
Facility 1	Power				

FUNCTION NO:	FUNCTION T	ITLE:				
4.40	Measure	Measurement System End to End Calibration				
FUNCTION OBJECTIV	'E:					
Calibrate	measurement	cyctom				
Januare	measurement	3y 6 Lein.				
SITE LOCATION ETR 🖾	TIME TO COMP		HAZARDOUS	х		
WTR []	MAX4	MIN2	YES NO_			
AREA LOCATION	PERSONNEL (H		GROUND SUPPORT EQUIPM			
OLF [TOTAL MANPO	TOR 1	LPS (X) OTHER X) (SPE	CIFY)		
OPF [] TPF X D	TEST ENGINEE	RS1	A-013, A-0	008		
SPF 🗔		ECH				
PCR 🖸		H TECH3				
	1	IEER ECH				
		PPORT				
			PROCEDURES	NEW	CHANGE	
TUG INTERFACE:		TUG ORIENTATION:	PAGES _	10	5	
ORBITER D	FACILITY D	HORIZONTAL □ VERTICAL ဩ	MANHOURS .	60	15	
SOFTWARE REQUIRE				·		
LPS	£					
ORB ON-BOARD CO	OMP 🗆					
GROUND CONTRO	LSTATION 🗍	kick stage				
OTHER	<u>~</u>	ACC Stage				
OPERATIONS:						
Utilize th	e LPS/Kick S	tage computers to	stimulate end instrumen	nts for a		
		um of three voltag				
						
REMARKS:						
		, 4 — 10 c / <u>4</u> 4 i		·		
COMMODITIES/CONS	UMABLES REG	华夏烈				
Facilit: F	ower					

以表情中的一句话,我们也不是一个人的话,他们也不是一个人的话,我们也是一个人的话,也是一个人的话,我们也是一个人的话,也是一个人的话,也是一个人的话,也是一个人的话,也是这个人的话,也是一个人的话,这一个人

FUNCTION NO:	FUNCTION T	TTLE:				
4.41	APS Pre	APS Pressure/Leak Checks				
FUNCTION OBJECTIV	E;					
Verify pre	ssure and fu	unctional integrity	of Kick Stage APS.			
			_			
OUTT LOOK TICK	THE TO COLE	LETE (UDS)	1			
SITE LOCATION ETR 🗗	TIME TO COMP	MIN4	HAZARDOUS YESXNO_			
WTR		the first of				
AREA LOCATION	PERSONNEL (H TOTAL MANPO	MED 4	GROUND SUPPORT EQUIPM LPS (本 OTHER 图 (SPE			
OLF []	TEST CONDUC	TOR		,		
TPF K	PROPULSION T	110	P-011			
SPF 🗆	1	L UI :				
PCR 🖸	MECH/STRU/TH AVIONICS TEC	1				
ORB 🗆	SAFETY ENGIN	IEER1				
		ECH				
			DROCEDURES	ALE 181	CUANCE	
TUG INTERFACE:	L	TUG ORIENTATION:	PROCEDURES	_	CHANGE	
ſ	ACILITY D	HORIZONTAL []	1		3_	
SPACECRAFT □ S	OFTWARE	VERTICAL X☐	MANHOURS .	<u> 36</u>	9	
SOFTWARE REQUIRE	MENTS:					
LPS ORB ON-BOARD CO	IMP []					
TUG ON-BOARD CO						
GROUND CONTROL	STATION 🗖					
OTHER						
OPERATIONS:						
Connect pr	essure and 1	eak check GSE, cle	ar area of personnel.	Pressurize	į.	
APS storage	e spheres to	flight pressure a	nd stabilize for 30 min	nutes.		
Pressurize	third side	and equalize press	ure across diaphragm.	Leak check	•	
(decay) fi	uid side. S	oap/bubble check a	ll connections. Verify	7 proper		
Vent press	egulation of	pressurization sy	stem. Leak check press	ure side.		
vent press	ures.					
			•			
		•				
REMARKS:	***************************************					
Hazardous	because of p	ressures.				
COMMODITIES/CONSU	MABLES REQUI	RED:				
Helium. Fac	cility Power					
	, J					

FUNCTION NO:	FUNCTION TI	FUNCTION TITLE:			
4.42	APS Fun	APS Functional Checks			
FUNCTION OBJECTIVE					
Verify pro	per APS valv	e response			
	•	•			
			1		
1	MAX 10		HAZARDOUS YESNO_	x	
WTR					
AREA LOCATION	PERSONNEL (H TOTAL MANPO	мер Д	GROUND SUPPORT EQUIPM		
OPF	TEST CONDUCT	TOR	P-011, A-008		
TPF KO SPF □		RS 1 ECH 2 I TECH	1-011, 4-000		
PCR 🗆	AVIONICS TECH	-l <u></u>			····
		EER			
	TECHNICAL SU	PPORT	PROCEDURES	NEW	CHANGE
TUG INTERFACE:		TUG ORIENTATION:	-	4	2
ORBITER DF	ACILITY OFTWARE	HORIZONTAL 🗍 VERTICAL 🔯	MANHOURS		6
	MP	ntrol system check valve responses t	out, perform an APS fu o input stimuli.	nctional	
* ;					
REMARKS:					
COMMODITIES/CONSU	MABLES REQUI	RED:			

FUNCTION NO:	FUNCTION TI	TLE:		
4.43	Control System Checkout			
FUNCTION OBJECTIVE	:			
Verify the provide pro			ermine spatial position and	
SITE LOCATION 1	TIME TO COMPL	 LETE (HRS)	HAZARDOUS	
	MAX16		YES NOX	
OLF -	1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1		GROUND SUPPORT EQUIPMENT LPS 译 OTHER 图 (SPECIFY) A-007, A-008, A-009, A-013, A-001	
, '	ZUAL CUNI. IE	PPORT		
	ACILITY []	TUG ORIENTATION: HORIZONTAL	PROCEDURES NEW CHANGE PAGES 5 3 MANHOURS 30 9	
SPACECRAFT SC		VERTICAL 🔀	MANAOURS	
SOFTWARE REQUIREM LPS ORB ON-BOARD CON TUG ON-BOARD CON GROUND CONTROL OTHER	1P 🗆			········
Connect GSE system resp tracker, su	onre. Veri	fy operation of the	Verify autopilot performance and e flight computer, IMU, star mission assignment.	
REMAPKS:	·			
COMMODITIES/CONSUM Facility Po		RED:		

FUNCTION NO:	FUNCTION TITLE:				
4.44	R.F. Sys	stem Checkout			
FUNCTION OBJECTIVE	:				
Verify func	tional opera	ation of communicat	ions and Data Management Systems. ં		
SITE LOCATION	TIME TO COMPL	ETE (HRS)	HAZARDOUS		
ETR 🔯 📙	MAX <u>24</u>	MIN	YESNO_X		
OLF [] OPF [] TPF KI	· = : · = : · · · · · · · · · · · · · ·		GROUND SUPPORT EQUIPMENT LPS (MARCHES OF A-001, A-006, A-008		
ORB 🗆					
	TECHNICAL SUI	PPORT1	PROCEDURES NEW CHANGE		
			PROCEDURES NEW CHANG PAGES 18 9 MANHOURS 108 27		
SOFTWARE REQUIREN LPS ORB ON-BOARD CON TUG ON-BOARD CON GROUND CONTROL OTHER	MP 🗆 MP 🗅		,		
OPERATIONS: Connect GSE and apply power, verify uplink command receipt and downlink response. Verify data storage capability, data conditioning, multiplexing, and timing. Operate and verify central logic/computer. Stimulate and verify Caution and Warning System.					
REMARKS:					
COMMODITIES/CONSU Facility Po		IRED:			

FUNCTION NO:	FUNCTION T	ITLE:			
4.45	Install	Install Motor in Stage			
FUNCTION OBJECTIVE	<u>:</u>				
Complete K	ick Stage Bu	ildup			
	TIME TO COMPI		HAZARDOUS		
ETR CY WTR	мах <u>б</u>	MIN4	YES, X NO		
	PERSONNEL (H		GROUND SUPPORT EQUIP		
† OLF □	TEST COMPLICA	roe			
TPF 🖾	TEST ENGINEE	RS1 ECH1	As required.		
SPF □	MECH/STRU/TH	1 TECH			
		11 EER1			
	QUAL CONT, TE	ECH			
	TECHNICAL SU	PPORT			
			PROCEDURES	NEW	CHANGE
TUG INTERFACE: ORBITER D F	ACILITY []	TUG ORIENTATION: HORIZONTAL		<u>3</u> 18	2
SPACECRAFT D S		VERTICAL 📈	MANHOURS		
SOFTWARE REQUIREN		,			
LPS ORB ON-BOARD COI TUG ON-BOARD COI GROUND CONTROL OTHER	MP 🗀				
OPERATIONS:	,				
		ea and install in nect to kick stage			
			·		
REMARKS:					
Hazardous b	ecause of h	oisting.			
COMMODITIES/CONSU	MABLES REQUI	RED:			

FUNCTION NO:	FUNCTION TI	TLE:	1	
4.46	CST Pre	ps		
FUNCTION OBJECTIVE				
Configure	all systems	for Kick Stage com	oined Systems Test	
SITE LOCATION ETR [3] WTR []	TIME TO COMPL		HAZARDOUS YESNOX	
AREA LOCATION OLF OPF TPF SPF PCR ORB	TEST CONDUCT TEST ENGINEE PROPULSION TO MECH/STRU/TH AVIONICS TECK	WER 7 FOR 1 ECH 1 H TECH 3	GROUND SUPPORT EQUIPMENT LPS (X) OTHER (X) (SPECIFY) A-001, A-008	
	SAFETY ENGIN QUAL CONT. TE	EER1		
	TECHNICAL SU	PPORT	PROCEDURES NEW	CHANGE
TUG INTERFACE: ORBITER D F SPACECRAFT D S	ACILITY D	TUG ORIENTATION: HORIZONTAL VERTICAL (X)	PAGES12 MANHOURS72	
SOFTWARE REQUIRE LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	OMP COMP			
	E and simula less ordnan		Tug in same configuration a	s
REMARKS:				
COMMODITIES/CONST	JMABLES REQU	RED:		

FUNCTION NO:	FUNCTION TI	FUNCTION TITLE:		
4.47	Combine	d System Test		
FUNCTION OBJECTIVE:				
Perform Kic	k Stage fun	ctional test in a s	imulated mission seque	ence.
	TIME TO COMPL	ETE (HRS)	HAZARDOUS	
ETR (3) WTR	мах <u>6</u>	MIN3_	YES NO.	<u>X</u>
OLF D OPF D TPF D SPF D	TOTAL MANPOWER 8 TEST CONDUCTOR 1 TEST ENGINEERS 2 PROPULSION TECH 1 MECH/STRU/TH TECH 1		GROUND SUPPORT EQUIPM LPS [X] OTHER Ø (SPE	
T	AVIONICS TECH SAFETY ENGIN	EER		
		PPORT		
			PROCEDURES	NEW CHANGE
	ORBITER			6 3 36 9
ORBITER SPACECRAFT SOFTWARE VERTICAL MANHOURS 36 9 SOFTWARE REQUIREMENTS: LPS SOFTWARE COMP STORE STORE STORE SOFTWARE SOFTWARE REQUIREMENTS: LPS SOFTWARE REQUIREMENTS: LPS SOFTWARE REQUIREMENTS: LPS SOFTWARE REQUIREMENTS: SOFTWARE REQUIREM				
REMARKS:				
COMMODITIES/CONSUM Facility Po		RED:		

FUNCTION NO:	FUNCTION T	TLE:			
4.48	Remove	GSE - Prep to Mate	with Tug		
FUNCTION OBJECTIV	E:				
Prep Kick	Stage for Tu	g Mate			
SITE LOCATION	TIME TO COMPI	LETE (HRS)	HAZARDOUS		
ETR X	MAX4	MIN2	YES, X NO		
AREA LOCATION	PERSONNEL (H	EADCOUNT) WER6	GROUND SUPPORT EQUIPM		
OLF [TEST CONDUCT	ror	LPS C OTHER (SPE	CIPY	
OPF □ TPF 🗭	TEST ENGINEE	FOR	H-018, H-028		
SPF □	MECH/STRU/TE	ECH1			
PCR 🗆	AVIONICS TECH	H	<u></u>	·	
ORB 🗆	SAFETY ENGIN	EER1 ECH1			
	TECHNICAL SU	PPORT			
			PROCEDURES	NEW	CHANGE
TUG INTERFACE:	*	TUG ORIENTATION:	 {	4	2
ORBITER D F	FACILITY SOFTWARE	HORIZONTAL □ VERTICAL 【X	MANHOURS.		6
SOFTWARE REQUIRE	· · · · · · · · · · · · · · · · · · ·	<u> </u>			,
LPS ORB ON-BOARD CO	OMP				
TUG ON-BOARD CO	MP 🗍				
GROUND CONTROI	LSTATION []				
OPERATIONS:		<u> </u>			······
			Kick Stage inspectio	n,	
Connect ha	ndling GSE,	hoist and move to	fug.		
[
REMARKS:					
Hazardous	due to hoist	ing.			
COMMODITIES/CONSU	JMABLES REQU	IRED:			

FUNCTION NO:	FUNCTION TI	TLE:			
4.49	Prepare	to Ship			
FUNCTION OBJECTIVE	Ε:				
Prepare Tug for shipment to WTR					
		•			
SITE LOCATION	TIME TO COMPL	ETE (HRS)	HAZARDOUS.		
ETR 28	MAX8	MIN4	YES, x NO		
AREA LOCATION	PERSONNEL (H	EADCOUNT)	GROUND SUPPORT EQUIPM		
OLF 🗆		WER6	LPS OTHER 1 (SPE	CIFY)	
OPF □ TPF D3:	TEST ENGINEE	RS1	н-020, н-024, н-0	23	
SPF □	MECH/STRU/TH	ECH3			
PCR 🗆	AVIONICS TECH	1 1 EER 1			
	QUAL CONT. TE	ECH			
	TECHNICAL SU	PPORT		···	
		THE COUNTY TICK	PROCEDURES	NEW	CHANGE 2
TUG INTERFACE: ORBITER F	ACILITY [TUG ORIENTATION: HORIZONTAL []		4	
SPACECRAFT □ S	OFTWARE []	VERTICAL 至	MANHOURS _	24	6
SOFTWARE REQUIRED	MENTS:				
ORB ON-BOARD CO	MP 🗆				
TUG ON-BOARD CO GROUND CONTROL					
OTHER					
OPERATIONS:					
			orizontal and place in entation kit for transp		
cantste.,	Attach trans	sportation institute	meation kit for transp	ortation.	
1					
					•
REMARKS:					
Hazardous b	ecause of Tu	g handling			
COMMODITIES/CONSU	JMABLES REQUI	IRED:			

FUNCTION NO:	FUNCTION TI	FUNCTION TITLE:			
4.50	Move to	Move to Shuttle Airfield			
FUNCTION OBJECTIVE Move Tug fro		uttle Airfield for	loading and transpor	t to WTR	
	TIME TO COMPL		HAZARDOUS		
WTR []	MAX6	MIN4	YES, X NO)	
AREA LOCATION PERSONNEL (HEADCOUNT) OLF		GROUND SUPPORT EQUI			
ORB 🗆	SAFETY ENGIN	1 EER1			
<u> </u>	QUAL CONT. TE	CH			
			PROCEDURES	NEW	CHANGE
TUG INTERFACE: ORBITER	ACILITY 🗆	TUGORIENTATION: HORIZONTAL 25 VERTICAL []	PAGE: MANHOUR	5 <u>2</u> 5 <u>12</u>	3
SOFTWARE REQUIREM LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER OPERATIONS: Using the pro-	MP	ow the Tug in the	cargo canister to the	Shuttle.	
REMARKS:					
Hazardous be	Hazardous because of transportation				
COMMODITIES/CONSU	MABLES REQUI	RED:			
N/A				······································	

FUNCTION NO:	FUNCTION TI	FUNCTION TITLE:			
4.51	Load on	Aircraft and Ship	to WTR		·
FUNCTION OBJECTIVE:					
Transport Tu	e from FTP	to ህጥቦ			
Transport ru	g mon mr	LO WIK			
		•			
1	TIME TO COMPL		HAZARDOUS		
ETR (E) N	VIAX6	M1N4	YESX NO_		
AREA LOCATION	PERSONNEL (H	EADCOUNT) NER2	GROUND SUPPORT EQUIPM		i
[OLF 15] [-	TEST CONDUCT	OR	LPS (SPE		
		RS1 ECH	H-022,		
SPF □	MECH/STRU/TH	I TECH			
	AVIONICS TECH SAFETY ENGIN	EER			
	QUAL CONT. TE	CH	ļ 		
	TECHNICAL SU	PPORT	PROCEDURES	NEW	CHANGE
TUG INTERFACE:		TUG ORIENTATION:		3	
ORBITER - FA			MANHOURS		
SOFTWARE REQUIREM		VEIT-10/10		. –	
LPS				•	
ORB ON-BOARD CON TUG ON-BOARD CON	AP 🗀				
GROUND CONTROL OTHER	STATION []				
OPERATIONS:				***************************************	
			ives at the Shuttle ai detached from the tra		will
and raised	to positio	n at the top of the	MDF. The empty cani	ster tran	
!			vill then be towed into		
			to the aircraft. The ved out of the MDF and		
for taxi, a	nd takeoff.				L
REMARKS:					
	aanaa ee e				
Hazardous be	cause of tra	ansportation			
COMMODITIES/CONSUMABLES REQUIRED:					
Gommod:: Tea, Gordonin, Idea of tea o					

FUNCTION NO:	FUNCTION TI	FUNCTION TITLE:		
4.52	In	ternal Area Cleani	ng	
FUNCTION OBJECTIVE	:			- de de colonia
Clean internal	area to be	compatible with c	leanliness requirement.	
SITE LOCATION	ТІМЕ ТО СОМРІ	LETE (HRS)	HAZARDOUS	
ETR 🖾 WTR 🗆	MAX5	MIN3	YES NOX	
AREA LOCATION	PERSONNEL (H	EADCOUNT) WER 6	GROUND SUPPORT EQUIPMENT	
OLF	TEST CONDUCT	ror	LPS OTHER 1 (SPECIFY	1
OPF [] TPF []	TEST ENGINEE	RS1 ECH1	H-026	
SPF 🗆	MECH/STRU/TH	1 TECH2		
PCR 🔾 ORB 🖸				
	QUAL CONT. TE	EER1		
	TECHNICAL SU	PPORT		
TUG INTERFACE:		TUG ORIENTATION:	PROCEDURES NE	W CHANGE
ORBITER - F	ACILITY D	HORIZONTAL []	MANHOURS	12 3
SPACECRAFT SISSIFTWARE REQUIREM		VERTICAL 図		
LPS				
ORB ON-BOARD CO				
GROUND CONTROL OTHER				
OPERATIONS:	<u></u>			
Wipe down inte	rnal Kick S	tage Areas and vac	uum to meet cleanliness re	quirements.
REMARKS:	. 1 .			
Factory	clean proce	essing		
COMMODITIES/CONSU	MABLES REQU	IRED:		
Cleaning Chemi	ical		•	
L				·····

FUNCTION NO:	FUNCTION TITLE:				
5.1	Tug and Spacecraft Mate				
FUNCTION OBJECTIVE	:				
Mechanically	mate the spacecraft to the Tu	g (kick stage)			
1	FIME TO COMPLETE (HRS)	HAZARDOUS			
WTR	MAX 12 MIN 4	YES X NO			
OLF - OPF - TPF SI SPF GD	PERSONNEL (HEADCOUNT) TOTAL MANPOWER 7 11** TEST CONDUCTOR 1 2** PROPULSION TECH 1** MECH/STRU/TH TECH 3	GROUND SUPPORT EQUIPMENT LPS ① OTHER ② (SPECIFY) A-001, P-008			
PCH W	AVIONICS TECH1_2**				
! 1	SAFETY ENGINEER 1 2**				
	TECHNICAL SUPPORT				
TUG INTERFACE:	TUG ORIENTATION:	PROCEDURES NEW CHANGE PAGES 5 3			
ORBITER D FA	ACILITY HORIZONTAL	PAGES			
SPACECRAFT SC		WANTOONS			
SOFTWARE REQUIREM LPS ORB ON-BOARD CON TUG ON-BOARD CON GROUND CONTROL OTHER	AP () AP ()				
OPERATIONS:					
and verify m attach point mechanical a	Connect LPS to energize pin pullers to the retract position and verify mate interface. Lift spacecraft into mate position and align attach points. Extend pin pullers to latch position and verify. Verify mechanical alignment.				
A spacecraft simulator will be utilized to demonstrate Tug engineering model mate and electrical connection.					
	· · · · · · · · · · · · · · · · · · ·				
REMARKS: Hazardous du	e to hoisting operations and o	ordnance.			
COMMODUTIES (COME)	MARIEC GEOLUGED.				
COMMODITIES/CONSUM	MADES REGUIRED:				
NAS8-31011 8-74 (P	RELIMINARY)				

SITE LOCATION TIME TO COMPLETE (HRS) HAYARDOUS YES NO x	FUNCTION NO:	FUNCTION TITLE:					
Load Tug computer flight software SITE LOCATION TIME TO COMPLETE (HRS) ETR £0 WTR £0 AREA LOCATION PERSONNEL (HEADCOUNT) TOTAL MANPOWER 2 6 *** OLF	5.2	Load and	Load and Verify Computer Flight Software				
## AREA LOCATION OLF TOTAL MANPOWER 2 6 ** TEST CONDUCTOR TEST CONDUCTOR TEST CONDUCTOR TEST ENGINEERS 1 PROPULSION TECH SPF			software				
OPERATIONS:	ETR & WTR & MTR &	PERSONNEL (HITOTAL MANPONTEST CONDUCT TEST ENGINEER PROPULSION TE MECH/STRU/TH AVIONICS TECH SAFETY ENGIN QUAL CONT. TE TECHNICAL SUIT ACILITY DETWARE SI	EADCOUNT) WER 2 6** OR	YES	PMENT PECIFY) 009 NEW	CHANGE 1	
REMARKS: COMMODITIES/CONSUMABLES REQUIRED:	OPERATIONS: Load Tug comp	outer with f		LPS and verify proper	response		

FUNCTION NO:	FUNCTION TI	TLE:	
5.3	Connect	S/C Simulator	
FUNCTION OBJECTIVE			
77-15			
Verify docking	ng/retrieval	l capability	
	· · · · · · · · · · · · · · · · · · ·		
1	FIME TO COMPL	ETE (HRS) MIN2	HAZARDOUS YESXNO
WTR 🗆			
'	PERSONNEL (H TOTAL MANPO	WER3	GROUND SUPPORT EQUIPMENT LPS 图 OTHER 図 (SPECIFY)
OLF OPF	TEST CONDUCT	TOR RS1	Н-027, Н-018
I TPF KI	PROPULSION TI	ECH	
I	MECH/STRU/TH AVIONICS TECH	H TECH1	
ORB [SAFETY ENGIN	EER	
		PPORT	
<u> </u>			PROCEDURES NEW CHANG
TUG INTERFACE:		TUG ORIENTATION:	PAGES 3 2
ORBITER D FA		HORIZONTAL [] VERTICAL 図	MANHOURS 18 6
SOFTWARE REQUIREM	-		
LPS ORB ON-BOARD COM			
TUG ON-BOARD CON GROUND CONTROL			
OTHER	Ō		
OPERATIONS:			
Hoist simula	tor and mate	e with Tug, verify	capture and latching mechanism
			·
REMARKS:			_
		ission assignments ng operation.	cnly.
COMMODITIES/CONSUL	MABLES REQUI	RED:	

FUNCTION NO:	FUNCTION TI	TLE:	
5.4	Function	nal Interface Test	(FIT)
FUNCTION OBJECTIVE	•		
Functionally	verify all	Tug/kick stage/space	cecraft interfaces
SITE LOCATION	TIME TO COMPL	ETE (HRS)	HAZARDOUS
1		MIN4	YESXNO
AREA LOCATION	PERSONNEL (H	EADCOUNT)	GROUND SUPPORT EQUIPMENT
OLF [TEST CONDUCT	WER 12 13** OR 1	LPS 图 OTHER 私 (SPECIFY)
TPF 🖫 📙		RS 2	A-001, A-008, A-011, A-012
() = 1	MECH/51 RU/ 15	1 TECH4	
ORB 🗆	SAFETY ENGIN	EER1	
	TECHNICAL SU	PPORT	
	Tech Writer	1 **	PROCEDURES NEW CHANGE
TUG INTERFACE:	ACILITY D	TUG ORIENTATION: HORIZONTAL []	PAGES116
SPACECRAFT D SC		VERTICAL M	MANHOURS 66 18
SOFTWARE REQUIREM	IENTS: 図		
ORB ON-BOARD CON TUG ON-BOARD CON	MP □		
GROUND CONTROL OTHER			
OPERATIONS:			
exercise all (liftoff thr will be moni	Tug/kick s ough S/C se tored and c functions	tage/spacecraft sys paration) using the ompared to establis	on. To the maximum extent possible, tems through the mission profile MSS/PSS flight hardware. Data h criteria for go, no-go conditions. hes will be monitored for proper
REMARKS:			
, Hazardous du	e to ordnan	ce	
COMMODITIES/CONSU	MABLES REQUI	RED:	
Facility pow	er		

FUNCTION NO:	FUNCTION TITLE:		STDN/TDRSS/SCF Verification (Open Loop)
5.5			
FUNCTION OBJECTIV	E:		
Verify the ground stat		d downlink to	each segment's controlling
SITE LOCATION	TIME TO COMPLETE (HRS)	HAZARDOUS
ETR & WTR 28	MAX8 MIN	2	YES X NO NO
AREA LOCATION OLF OPF	PERSONNEL (HEADCO TOTAL MANPOWER_ TEST CONDUCTOR _ TEST ENGINEERS_	61	GROUND SUPPORT EQUIPMENT LPS (3: OTHER (SPECIFY) A-001
TPF ED SPF ED PCR ED	PROPULSION TECH MECH/STRU/TH TECH	12	<u>A-001</u>
ORB -	SAFETY ENGINEER QUAL CONT. TECH TECHNICAL SUPPORT	<u>+</u> _	
			PROCEDURES NEW CHANGE
TUG INTERFACE: ORBITER SPACECRAFT SPACE	ACILITY 🗆 HO	DRIENTATION: RIZONTAL [] RTICAL [S]	PAGES <u>5</u> <u>3</u> MANHOURS <u>30</u> 9
compatible	OMP L STATION D d segment (Tug/ki	ve ground stat	ecraft) will be verified to be cion. Each station will pop.
Hazardous d	ue to on-board or	dnance and S/C	propellant.
COMMODITIES/CONSU	JMABLES REQUIRED:		

のでは、これでは、これでは、100mmのでは、100mm

FUNCTION NO: 5.6	FUNCTION TITLE: Payload to Orbiter Communications Verification (Open Loop)				
FUNCTION OBJECTIVE:					·····
Verify RF com	patibility	between the orbiter	and Tug communication	ons system	s.
SITE LOCATION T	ІМЕ ТО СОМРІ	LETE (HRS)	HAZARDOUS		^***···
ETR 🖾 N	AX8	MIN2	YES, X NO.		
OLF CT TO TO TO THE COLOR OF CT TO THE CT TO THE	EST CONDUCT EST ENGINEE ROPULSION T	WER 6 7** FOR 1 RS 1 2** ECH	GROUND SUPPORT EQUIPM LPS ③ OTHER ☐ (SPE A-001		
PCR 妃	VIONICS TECH AFFTY ENGIN	1 TECH2 H2 EER1			
 C	UAL CONT. TE	PPORT			
			PROCEDURES	NEW	CHANGE
TUG INTERFACE: ORBITER	CILITY FTWARE	TUG ORIENTATION: HORIZONTAL ☐ VERTICAL ᡚ	PAGES . MANHOURS .	<u>4</u> 24	
	TATION		erform all mission con esponses will be ver		ns
	to on-boar	rd ordnance and spac	ecraft propellants		
COMMODITIES/CONSUM	ABLES REQUII	RED:			

FUNCTION NO:	FUNCTION T	TLE:	
5.7	Install	Flight Battery	
FUNCTION OBJECTIV	E:	-	
Install and	Connect Flig	ght Battery	
SITE LOCATION ETR &	TIME TO COMPI		HAZARDOUS
WTRE	MAX4	MIN	YESX NO
AREA LOCATION	PERSONNEL (H	EADCOUNT) WER5_6**	GROUND SUPPORT EQUIPMENT LPS () OTHER (B) (SPECIFY)
OLF []	TEST CONDUCT	FORRS	
TPF 🖾	PROPULSION T	ECH	A-001, H-021
PCR 51 ORB □	AVIONICS TEC	H TECH 1 2**	
	QUAL CONT. TI	EER 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	TECHNICA!. SU	PPORT	DD005DUD50 NEW OUNDS
TUG INTERFACE:		TUG ORIENTATION:	PROCEDURES NEW CHANGE PAGES 2 1
ORBITER D F	ACILITY SOFTWARE	HORIZONTAL ☐ VERTICAL ☑	MANHOURS 12 3
SOFTWARE REQUIRE LPS ORB ON-BOARD CO	MENTS:		
TUG ON-BOARD CO GROUND CONTROL OTHER	MP 🗆		
OPERATIONS:			
		rage and verify bat tion system.	tery at full capacity. Install on Tug
		·	
A GSE batte	ry will be u	tilized for Tug eng	ineering model checkout.
REMARKS:			
Hazardous d	ue to ordnan	ce and spacecraft p	ropellants.
COMMODITIES/CONSL	IMABLES REQUI	RED:	
L			

FUNCTION NO:	FUNCTION TI	TLE:				
5.8	Connect	Connect Ordnance and Verify Safe				
FUNCTION OBJECTIVE	=: =:					
Perform fina	al ordnance o	connections				
						
SITE LOCATION ETR 3	TIME TO COMPL	LETE (HRS) MIN_2	HAZARDOUS YESX NO			
WTRE						
OLF	PERSONNEL (H TOTAL MANPO TEST CONDUCT	WER6	GROUND SUPPORT EQUIPMENT LPS □ OTHER ☑ (SPECIFY)			
OPF 🗆	TECT ENGINEE	pe I	Electronic equipment			
TPF ⊠ SPF ☑	PROPULSION TO MECH/STRU/TH	ECH 1	DISCUSSION ENGINEERS			
PCR ❷ ORB □	AVIONICS TECH	1 1 EER 1 1 1 1 1 1 1 1 1 1				
	QUAL CONT. TE	CH				
	TECHNICAL SU	PPORT	PROCEDURES NEW	CHANGE		
TUG INTERFACE:		TUG ORIENTATION:	PAGES4	2		
ORBITER SPACECRAFT SPACECRA	ACILITY D	HORIZONTAL [, VERTICAL 🔀	MANHOURS 24	6		
SOFTWARE REQUIRE						
LPS ORB ON-BOARD CO						
TUG ON-BOARD CO GROUND CONTROL						
OTHER						
OPERATIONS:						
Verify no c	urrent at ea	ch ordnance connec	tor with power on/off. connect			
ordnance in	terface conn	ectors. Verify or	tor with power on/off, connect dnance items in safe configurat	ion.		
	age (when in	stalled) verify sa	fety pin is in place on sefe an	.d		
arm device.						
:						
1						
REMARKS:						
Hazardous d	ue to ordnan	ce and spacecraft	propellants			
COMMODITIES/CONST	MADI CO DECLU	UDED.				
COMMODITIES/CONSU	MIABLES REQUI	ועבח:				

FUNCTION NO:	FUNCTION TITLE:					
5.9	Move to	Move to APS Propellant Loading Bay				
FUNCTION OBJECTIVE						
Transport Pa	ayload to N ₂	H ₄ Loading Area				
SITE LOCATION	ТІМЕ ТО СОМРІ	ETE (HRS)	HAZARDOUS	/		
ETR 50 WTR 20	MAX <u>6</u>	MIN2	YES X NO			
WIRE PERSONNEL (HEADCOUNT) OLF TOTAL MANPOWER 4 11** OPF TEST CONDUCTOR 2** TPF PROPULSION TECH 2** SPF MECH/STRU/TH TECH 2** AVIONICS TECH 2**		GROUND SUPPORT EQUIPMENT LPS □ OTHER ☑ (SPECIFY) H-025, H-018				
ORB 🗆	SAFETY ENGIN QUAL CONT. TO	EER 1 2**				
		PPORT				
TUG INTERFACE:		TUG ORIENTATION:	PROCEDURES PAGES	NEW CHANGE		
ORBITER	ACILITY [OFTWARE □	HORIZONTAL [] VERTICAL [3	MANHOURS	12 3		
install in v	MP STATION O The state of th	workstands and move	e to APS fueling bay and	l ·		
		ce and S/C propella DOD upper segments	ants. Loading area will	be		
COMMODITIES/CONSU	MARI ES REOLU	RED:				
SOMMODITIES/CONSU	minuces nedol					

FUNCTION NO:	FUNCTION TI	TLE:	1		
5.10	Partial	Partial Tug Pressurant Load			
FUNCTION OBJECTIVE	:				
Pressurize T	ug pressuriz	ation system to 1/3	flight pressure		
1 1	TIME TO COMPL		HAZARDOUS		
ETR 图 WTR 图	MAX6	MIN1.5	YES, x NO.		
AREA LOCATION	PERSONNEL (HE	EADCOUNT) WER7	GROUND SUPPORT EQUIPM		
OLF [TEST CONDUCT	or 1	LPS 図 OTHER □ (SPE		
OPF 🗋	TEST ENGINEER	RS 1 ECH 2	A-005, P-011, P-0	16	
5PF 480	MECH/STRU/TH	TECH			
		<u> </u>			
1	SAFETY ENGIN QUAL CONT. TE	EERL			
		PPORT			
			PROCEDURES	NEW CHANGE	
TUG INTERFACE:		TUG ORIENTATION:	PAGES _	4 2	
ORBITER D F	ACILITY □ OFTWARE □	HORIZONTAL ☐ VERTICAL ☑	MANHOURS _	2 4 6	
SOFTWARE REQUIREN		<u> </u>			
LPS					
ORB ON-BOARD COI	MP 🗀				
GROUND CONTROL OTHER	STATION []				
OPERATIONS:					
Connect pres	surization G	SE and LPS. Pressu	rize Tug pressurizati	on system to	
1100 psi.					
		•			
REMARKS:					
Hazardous be	ecause of ord	lnance, spacecraft	propellants and pressu	rization	
COMMODITIES/CONSU	MABLES REQUII	RED:			

FUNCTION NO:	FUNCTION TI	TLE:			
5.11	Load APS	, Leak Check and S	ecure		
FUNCTION OBJECTIVE	:				
Load APS Pro	pellant				
					
	TIME TO COMPL	_	HAZARDOUS	^	
WTR 29	MAX12	MIN	YES,X N	· · · · · · · · · · · · · · · · · · ·	
1	PERSONNEL (HI	ALED 7	GROUND SUPPORT EQUI		
OLF () -	TEST CONDUCT	OR1			
OPF 🖸	TEST ENGINEE! PROPULSION T	RS1		<u> </u>	
SPF Dx	MECH/STRU/TH	TECH			
PCR □ ORB □	AVIONICS TECH	1 <u> </u>			
	SAFETY ENGIN QUAL CONT. TE	EER1 ECH1			
	TECHNICAL SU	PPORT	•		
			PROCEDURES	NEW	CHANGE
TUG INTERFACE:		TUG ORIENTATION:	PAGE	s <u>3</u>	1
ORBITER	ACILITY 🗍 OFTWARE 🗍	HORIZONTAL 广 VERTICAL 包	MANHOUR	s <u>18</u>	3
SOFTWARE REQUIREN	MENTS:				,
LPS ORB ON-BOARD CONTUG ON-BOARD CONGROUND CONTROL OTHER	MP 🗀				
OPERATIONS:	*				
Evacuate pro	pellant sid de and verif	e of APS system and y no system leakage	charge with N_2H_4 ,	pressurize	,
Tug engineer	ring model w	ill be unloaded, f	lushed and purged to	safe leve	1.
REMARKS:	······································				
Hazardous du required.	ue to ordnan	ce, propellant and	pressures. Protect	ive clothi	ng
COMMODITIES/CONSU	MABLES REOLU	RED:			
25					

FUNCTION NO:	FUNCTION T	ITLE:		<u> </u>
5.12	Prep t	co Move		
FUNCTION OBJECTIV	'E:		***************************************	
Prepare Tug	to Move			
	T			
SITE LOCATION ETR 🖎	TIME TO COMP	MIN_1	HAZARDOUS YESNOX	
WTR □				
AREA LOCATION	PERSONNEL (H	HEADCOUNT) WER5	GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY)	
OLF []	TEST CONDUCT	TOR		
TPF 街		RS1 ECH1	P-009, H-025, H-004	
SPF 저	MECH/STRU/TI	H TECH3		
PCR □ ORB □		H JEER		
	QUAL CONT. T	ECH		-
	TECHNICAL SU	IPPORT		
THE INTERESE		TUC OBJENITATION.	PROCEDURES NEW	
TUG INTERFACE: ORBITER	FACILITY []	TUG ORIENTATION: HORIZONTAL	PAGES 3	
SPACECRAFT 🗆	SOFTWARE 🗆	VERTICAL &	MANHOURS 18	
SOFTWARE REQUIRE LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTRO OTHER OPERATIONS:	DMP DMP DL STATION D			
tagged. At	tach handlin	g GSE and verify T	and all pressurized systems ug is clear to be hoisted. ement. Seal canister to fact	
REMARKS:				
COMMODITIES/CONST	JMABLES REQUI	IRED:		

FUNCTION NO:	FUNCTION TITLE					
5.13	Install o	n Transporter a	nd Cover			
FUNCTION OBJECTIVE						
Place Tug on	Transporter an	d Cover				
	TIME TO COMPLETE MAX 4 MIN		HAZARDOUS YESX	NO		
AREA LOCATION OLF OPF TPF SPF ×C PCR ORB ORB	AVIONICS TECH		GROUND SUPPO		IFY)	
			PROCEDURES		NEW	CHANGE
TUG INTERFACE: ORBITER	ACILITY 🗆 H	ORIENTATION: IORIZONTAL () 'ERTICAL ()	M	PAGES ANHOURS		3
SOFTWARE REQUIREM LPS ORB ON-BOARD COI TUG ON-BOARD COI GROUND CONTROL OTHER	MP 🖸					
		s, rotate to ho out of clean a				
REMARKS: Hazardous o	due to hoisting	and movement.				
COMMODITIES/CONSU	MABLES REQUIREE):		alada ya maraka da wasan da waka wa 1974a		

5.14 Move to S/C Checkout Area	
- WOTION OF ITOTAL	
FUNCTION OBJECTIVE:	
Transport Tug to S/C checkout area	
SITE LOCATION TIME TO COMPLETE (HRS) HAZARDOUS	
ETR & MAX 4 MIN 3 YES X NO YES X NO	
AREA LOCATION PERSONNEL (HEAD/ JUNT) TOTAL MANPOWER 2 LPS OTHER Q (SPECIFY) OLF C TEST CONDUCTOR TEST ENGINEERS 1 GFE TPF C PROPULSION TECH SPF C MECH/STRU/TH TECH H-004, H-019	
PCR U AVIONICS TECH SAFETY ENGINEER 1	
TECHNICAL SUPPORT PROCEDURES NEW CH	ANGE
TUG INTERFACE: TUG ORIENTATION: PAGES 2 DI ORBITER DI FACILITY DI HORIZONTAL DI MANHOURS 12 DI MANHOURS 12 DI CONTROLE DI CONT	
SOFTWARE REQUIREMENTS: LPS ORB ON-BOARD COMP TUG ON-BOARD COMP GROUND CONTROL STATION OTHER	
OPERATIONS: Attach prime mover and tow Tug to the S/C checkout area and disconnect prime mover. Hoist Tug and rotate to vertical, position Tug in workstand.	
REMARKS:	
llazardous due to transportation	
COMMODITIES/CONSUMABLES REQUIRED:	

FUNCTION NO:	FUNCTION T	ITLE:			
5.15	Prepar	Prepare to Mate with Spacecraft			
FUNCTION OBJECTIVE	FUNCTION OBJECTIVE:				
Ready Tug fo	r S/C Mate				
SITE LOCATION ETR 🕄	TIME TO COMP		HAZARDOUS		
WTR []	MAX	MIN1	YESNOX		
AREA LOCATION	PERSONNEL (H TOTAL MANPO	IEADCOUNT) WER4	GROUND SUPPORT EQUIPMENT LPS □ OTHER ☒ (SPECIFY)		
OLF [] OPF []	TEST CONDUCTEST ENGINEE	rorI	H-019, A-004		
TPF □ SPF 🖺	PROPULSION T	ECH	4273 14 004		
PCR □ ORB □	AVIONICS TEC	H			
	QUAL CONT. T	ECH			
		PPORT	PROCEDURES NEW	CHANGE	
TUG INTERFACE:	ACILITY D	TUG ORIENTATION:	PAGES1		
ORBITER D F SPACECRAFT D S		HORIZONTAL [] VERTICAL ₺	MANHOURS <u>6</u>	3	
SOFTWARE REQUIRED	MENTS:			,	
ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	MP □				
OPERATIONS:					
			transportation cover.		
verity ing o	rientation a	ınd interface are r	eady for mate.		
REMARKS:					
COMMODITIES/CONSU	MABLES REQUI	RED:			
NAS8.31011 8.74 (P	DEL IMINIA DVI				

A-117 ·

FUNCTION NO:	FUNCTION TI	TLE:		
5.16				
FUNCTION OBJECTIVE	E:			
Left bla	nk intention	aally		
SITE LOCATION	TIME TO COMPI		HAZARDOUS	
ETR WTR	MAX	MIN	YES NO	
AREA LOCATION OLF OPF TPF	PERSONNEL (HEADCOUNT) TOTAL MANPOWER TEST CONDUCTOR TEST ENGINEERS			
SPF □ PCR □	MECH/STRU/TH	1 TECH		
ORB 🗆	SAFETY ENGIN	EER	1	
		PPORT		
		Tue object to the	PROCEDURES NE	
TUG INTERFACE: ORBITER D F SPACECRAFT D S		TUG ORIENTATION: HORIZONTAL VERTICAL		
SOFTWARE REQUIRE		VENTIONE O		
LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	MP 🗆			
OPERATIONS:			<u> </u>	
ļ				
REMARKS:				
COMMODITIES/CONSU	IMARI ES REOLU	IRED:		
CONTINIOD I TES/CONSC	MINDEES REGUI	med.		

FUNCTION NO:	FUNCTION T	ITLE:				
5.17	Insta	Install Tug in Canister				
FUNCTION OBJECTIV	E:					
Place Tug in	n Canister					
SITE LOCATION	TIME TO COMPI		HAZARDOUS			
ETR 🗷 WTR 🖂	MAX <u>8</u>	MIN3.5	YESX NO			
AREA LOCATION	PERSONNEL (H		GROUND SUPPORT LOUIPMENT			
OLF [TEST CONDUCT	WER5 TOR	LPS OTHER 10 (SPECIFY)			
OPF □ TPF 図	TEST ENGINEE	RS1 ECH	н-018			
SPF (E) PCR (C)	MECH/STRU/TH	1 TECH2	GFE Canister			
ORB 🗆	SAFETY ENGIN	H. <u>!</u> JEER <u>1</u>				
		PPORT				
			PROCEDURES NEW	CHANGE		
TUG INTERFACE:		TUG ORIENTATION:	PAGES 3			
ORBITER DF SPACECRAFT DS	SOFTWARE	HORIZONTAL ☐ VERTICAL (3:	MANHOURS 18	6		
SOFTWARE REQUIRE				······································		
LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	MP 🗆					
OPERATIONS:						
Hoist Tug f		pellant loading GSI d and place in the	E, attach handling equipment. canister bay.			
REMARKS:		·				
Hazardous d	ue to ordnan	ce, propellant and	hoisting operations			
COMMODITIES/CONSU	JMABLES REQUI	IRED:				
· · · · · · · · · · · · · · · · · · ·						

FUNCTION NO:	FUNCTION TI	TLE:	0		
5.18	Verif	Verify Canister Environment, Move to Pad and Spot			
FUNCTION OBJECTIVE					
Mario Tuo to	Dad				
Move Tug to	rau				
SITE LOCATION	TIME TO COMPL	ETE (UPC)	HAZARDOUS		
ETR 53		MIN_8	YES, X NO.	_	
WTR AREA LOCATION OLF OPF iPF OB	TEST CONDUCT	EADCOUNT) WER2 FOR RS1	GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY) GFE		
SPF □	MECH/STRU/TH	ECH H TECH H EER1 /			
		PPORT			
				HANGE	
TUG INTERFACE: ORBITER	ACILITY 🗆 OFTWARE 🗆	TUG ORIENTATION: HORIZONTAL 门 VERTICAL 哲	PAGES 6 MANHOURS 36	9	
SOFTWARE REQUIRES LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	MP 🖸				
Attach prime	er doors and e mover to tr nister for P	cansporter and tran	lish controlled environment. Asfer to pad. Roll into PCR bay a	ınd	
REMARKS:					
Hazardous du	ie to ordnan	ce, propellants and	d transportation		
COMMODITIES/CONSU	MABLES REQU	RED:			

FUNCTION NO:	FUNCTION TI	TLE: Install Canis	ter with PCR and Place		
5.19		Tug on Manipulator			
FUNCTION OBJECTIVE:					
			•		
Install Tug	in PCR Paylo	oad Manipulator			
{	TIME TO COMPL	ETE (HRS)	HAZARDOUS		
ETR 🖄 WTR 🗆	MAX8	MIN5	YES, NO		
AREA LOCATION	PERSONNEL (H	EADCOUNT) WER2	GROUND SUPPORT EQUIPMENT		
OLF []	TOTAL MANPO	WER2	LPS □ OTHER ① (SPECIFY)		
OPF 🗀	TEST CONDUCT	RS1	GF E		
TPF D	PROPULSION T	ECH	- GED		
SPF □ PCR ★□	MECH/STRU/TH	TECH	<u> </u>		
ORB 🗆	AVIONICS LECT SAFFTY ENGIN	1 EER1			
<u> </u>	QUAL CONT. TE	CH			
	TECHNICAL SU	PPORT			
			PROCEDURES NEW	CHANGE	
TUG INTERFACE:		TUG ORIENTATION:	PAGES5	3	
ORBITER	ACILITY 🗷	HORIZONTAL 🗀 VERTICAL 🕱	MANHOURS30	9	
SOFTWARE REQUIREM		VENTIOAL IS			
LPS ORB ON-BOARD COM TUG ON-BOARD COM GROUND CONTROL OTHER	MP ()				
OPERATIONS:					
Inflate canister seal, open PCR hatch, and verify clean environment. Remove canister end cover and hoist payload from canister. Place Tug on manipulator and secure.					
REMARKS:					
Hazardous du	e to ordnand	ce, propellant, hoi	isting		
CCMMODITIES,'CONSU	MABLES REQUI	RED:		· · · · · · · · · · · · · · · · · · ·	
					

FUNCTION NO:	FUNCTION T	ITLE:		
5.20	Remove	e Canister		
FUNCTION OBJECTIVE	:			
Remove Cani	ster from PO	CR		
1	TIME TO COMP		HAZARDOUS	
ETR &B WTR□	MAX	MIN_3.0	YES, X NO	
1	PERSONNEL (H	EADCOUNT) WER2	GROUND SUPPORT EQUIPM - LPS □ OTHER □ (SPI	
OLF []	TEST CONDUC	ror1	- LEGET OTHER DECOME	:GIF1)
		RSI ECH		
SPF 🗅		TECH		
PCR ☑	AVIONICS TECH	H IEER1		·····
		ECH		
		PPORT		
			PROCEDURES	NEW CHANGE
TUG INTERFACE:		TUG ORIENTATION:		11
ORBITER	ACILITY 🗀 OFTWARE 🗀	HORIZONTAL □ VERTICAL ᡚ	MANHOURS	12 3
SOFTWARE REQUIREM	IENTS:	<u> </u>		
LPS ORB ON-BOARD COM				
TUG ON-BOARD COM	VIP 🗍			
GROUND CONTROL OTHER	STATION [
OPERATIONS:				
D. 67				
		Lower canister a emove and stow can		
}				
REMARKS:				
Hazardous du	e to hoistir	ng and movement		
COMMODITIES/CONSUI	MABLES REQUI	RED		

FUNCTION NO:	FUNCTION TI	TLE:				
5.21	Tug and	Tug and Spacecraft Mate				
FUNCTION OBJECTIVE Mechanically		pacecraft to the Tu	g (Kick Stage)			
SITE LOCATION ETR WTR WTR AREA LOCATION OLF OPF TPF ORF PCR ORB ORB TUG INTERFACE:	TEST CONDUCT TEST ENGINEE PROPULSION T MECH/STRU/TH AVIONICS TECH SAFETY ENGIN QUAL CONT. TE	### ### ##############################	HAZARDOUS YES, X NO NO NO NO NO NO NO NO NO NO NO NO NO	CHANGE		
	ACILITY	HORIZONTAL □ VERTICAL 図	MANHOURS 30			
and verify attach poin	to energize mate interfacts. Extend	ce. Lift spacecrai	retracted position It into mate position and al Th position and verify. Ver			
Ī	be termed		3			
Hazardous d	ue to hoisti	ng operations and o	ordnance			
COMMODITIES/CONSU	JMABLES REQU	IRED:	<u></u>			

FUNCTION NO:	FUNCTION TI	TLE:	
5.22	Move to	PCU	
FUNCTION OBJECTIVE	Ē:		
Move Tug fro	om OLF to PC	U for receiving and	inspection activities.
SITE LOCATION ETR	TIME TO COMPL	LETE (HRS) MIN1	HAZARDOUS YESx NO
WTR 🔀			
AREA LOCATION	PERSONNEL (H TOTAL MANPO	EADCOUNT\ WER4	GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY)
OLF OPF		ror rs1	
TPF 🗆	PROPULSION T	ECH	н-025, н-018, н-029, н-024, н-019
PCR 🕄	AVIONICS TECT	1 TECH	
ORB Transportation	SAFETY ENGIN	EER1	
		PPORT	
			PROCEDURES NEW CHANGE
TUG INTERFACE: TUG ORIENTATION: ORBITER FACILITY HORIZONTAL 2			PAGES
SPACECRAFT S		VERTICAL	MANHOURS 12 3
SOFTWARE REQUIRE			
ORB ON-BOARD CO			
GROUND CONTROI OTHER	_STATION 🗆		
OPERATIONS:			
Using the p	rime mover t	ow the Tug in the C	argo canister to the PCU.
Remove tran	sportation c canister, ro	over and attach han tate to vertical an	dling equipment. Hoist Tug d place in vertical workstand.
		nspection panels.	
1			·
REMARKS:	due to trans	nortation	
nazardous	age to trails	portacion	
COMMODITIES/CONSU	JMABLES REQUI	IRED:	
n/A			
1			

FUNCTION NO:	FUNCTION T	ITLE:		
5.23	Move into Elevator and Elevate to PCR			
FUNCTION OBJECTIV Move payload				
SITE LOCATION ETR	PERSONNEL (H TOTAL MANPO TEST CONDUCT TEST ENGINEE PROPULSION T MECH/STRU/TH AVIONICS TECH SAFETY ENGIN QUAL CONT. TI TECHNICAL SU	MIN2 EADCOUNT) WER5 TOR RS1 ECH 1 TECH3 H EER1 ECH PPORT TUG ORIENTATION:	HAZARDOUS YES, X NO_ GROUND SUPPORT EQUIPMI LPS OTHER (SPEC	ENT CIFY) NEW CHANGE 4 2
ORBITER D F	ACILITY 🖾 OFTWARE 🗀	HORIZONTAL 口 VERTICAL 色	MANHOURS _	27.
	MP	nt, hoist payload aise elevator to P	from vertical workstand CR level.	and place
REMARKS:				
Hazardous be	ecause of Tu	g handling		
COMMODITIES/CONSU	MABLES REQUI	RED:		

FUNCTION NO:	FUNCTION T	FUNCTION TITLE:				
5.24	Mate to	Mate to Manipulator, Remove Non-Flight Hardware				
FUNCTION OBJECTIV	E:					
 Install pay	load in PCR					
SITE LOCATION	ТІМЕ ТО СОМР		HAZARDOUS	······································		
ETR [] WTR [3]	MAX	MIN2	YES NO NO			
AREA LOCATION	PERSONNEL (H	EADCOUNT) WER4	GROUND SUPPORT EQUIPMENT			
OLF []	TEST CONDUCT	ror1	LPS OTHER (SPECIFY)			
OPF □ TPF □	TEST ENGINEE	RS	H-018, H-029			
SPF 🗆	PROPULSION T	ECH				
PCR 🐔	AVIONICS TECH	HTECH 2				
ORB 🗆	SAFETY ENGIN	SER1				
	QUAL CONT. T	ECH				
	TECHNICAL SU	PPORT				
			PROCEDURES NEW			
TUG INTERFACE:	- A CULTY 60	TUG ORIENTATION:	PAGES4	_ 2		
ORBITER D S SPACECRAFT D S	FACILITY 🕅 SOFTWARE 🗌	HORIZONTAL VERTICAL R	MANHOURS24	6		
SOFTWARE REQUIRE						
LPS						
ORB ON-BOARD CO		•				
GROUND CONTRO						
OTHER				r		
OPERATIONS:						
Move manipu	lator into p	osition and lift p	ayload from elevator fixture			
and positio	n for PCR-Or	biter mate. Remov	e non-flight item from payload.			
REMARKS:						
Hazardous b	ecause of pa	yload handling				
2014405	Stanten er er er	Inch.				
COMMODITIES/CONSU	JMABLES REQU	IKEU:				

FUNCTION NO:	FUNCTION TI	TLE:			
5.25	Establ:	Establish 100K Clean Room			
FUNCTION OBJECTIVE Establish 100K		t to facilitate pay	vload mate and integrated chackout.		
1 .12]	TIME TO COMPL	ETE (HRS) MIN3	HAZARDOUS YES, NO X		
AREA LOCATION OLF OPF	TEST CONDUCT TEST ENGINEE PROPULSION TI MECH/STRU/TH	EADCOUNT) WER 3 OR 1 ECH 1 TECH 1	GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY)		
ORB 🗆	SAFETY ENGIN QUAL CONT. TE	EER 1			
TUG INTERFACE:	ACILITY 🗆	TUG ORIENTATION: HORIZONTAL □ VERTICAL 凶	PROCEDURES NEW CHANG PAGES 4 2 MANHOURS 24 6		
SOFTWARE REQUIRED LPS ORB ON-BOARD COL TUG ON-BOARD COL GROUND CONTROL OTHER	MP 🗆				
OPERATIONS: After Payload established.	is mated, th	he clean room is c	losed up and 100K environment is		
REMARKS:					
Facto	ory clean pro	ocessing			
COMMODITIES/CONSU		RED:			

FUNCTION NO:	FUNCTION TI	TLE:	
5.26	External	Surface Cleaning	
FUNCTION OBJECTIVE	:		
Clean external	sufraces to	o be compatible wi	th cleanliness requirements.
77.	ГІМЕ ТО COMPI мах б	LETE (HRS)	HAZARDOUS YESNOX
WIR			
		WER6	GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY)
OPF []	TEST CONDUCT TEST ENGINEE	ror	
TPF LX I	PROPULSION T	ECH 1	
PCR □	MECH/STRU/TH AVIONICS TECH	1 TECH 2 1	
		EER	
	TECHNICAL SU	PPORT	
			PROCEDURES NEW CHANG
TUG INTERFACE:		TUG ORIENTATION:	PAGES42
ORBITER	ACILITY OFTWARE		MANHOURS 24 6
SOFTWARE REQUIREM			
LPS ORB ON-BOARD COM	/IP 📋		
TUG ON-BOARD CON GROUND CONTROL	/IP 📋		
OTHER	31A11ON D		
OPERATIONS:			
	rnal surface	es of Tug with clea	nning chemical to meet cleanliness
requirements.			
REMARKS:			
Factory cle	an processi	ng	
COMMODITIES/CONSUM	ABLES REQUI	RED:	

FUNCTION NO:	FUNCTION TITLE:	
6.1	Install Payload in Canister	;
FUNCTION OBJECTIVE	•	
Place Payloa	nd in Canister	
SITE LOCATION	TIME TO COMPLETE (HRS)	HAZARDOUS
1 <u> </u>	MAX 8 MIN 3.5	YES, x NO.
AREA LOCATION	PERSONNEL (HEADCOUNT)	GROUND SUPPORT EQUIPMENT
OLF [] OPF []	TOTAL MANPOWER 9 15** TEST CONDUCTOR 10 11 11 11	LPS 〇 OTHER 紀 (SPECIFY) H-018,H-031 (Alt)
TPF 図 SPF □	TEST ENGINEERS 1 3** PROPULSION TECH 2	
PCR 🗆	PROPULSION TECH 2 MECH/STRU/TH TECH 3 AVIONICS TECH 1 2**	GF E
ORB 🗆	QUAL CONT. TECH14**	
	TECHNICAL SUPPORT	PROCEDURES NEW CHANGE
TUG INTERFACE:	TUG ORIENTATION:	PAGES 3 2
ORBITER D F SPACECEAFT D S	ACILITY HORIZONTAL OFTWARE VERTICAL	MANHOURS 18 6
SOFTWARE REQUIRER LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	☐ MP ☐ MP ☐	
OPERATIONS:		
Disconnect p Hoist payloa	pressure/propellant loading GSE ad from workstand and place in	, attach handling equipment. the canister bay.
Alternate:	Uses manipulator (H-031) to attachister.	tach to payload and place in
REMARKS:		
Hazardous du	ue to ordnamace, propellant and	hoisting operations.
COMMODITIES/CONSU	IMABLES REQUIRED:	

出了,我们是我们是不会是不是不会的,我们是我们是我们是我们是我们是我们的一个,我们也是我们是我们是我们是我们是我们是我们是我们是我们的,我们们是我们的一个人,也

FUNCTION NO:	FUNCTION TITLE:				
5.2	Verify Cannister E	Verify Cannister Environment, Move to Pad and Spot.			
FUNCTION OBJECTIVE	:				
	• • •				
Deliver payl	oad to pad				
1 1	TIME TO COMPLETE (HRS)		HAZARDOUS		
WTR [MAX 20 MIN 8		YESNO	417.4 T-18.4	
	PERSONNEL (HEADCOUNT) TOTAL MANPOWER2		GROUND SUPPORT EQUIPMI		
OLF [TEST CONDUCTOR		LPS OTHER 10 (SPE	JIFY)	
OPF TPF	TEST ENGINEERS		GFE_equipment		
SPF 🖸	MECH/STRU/TH TECH				
PCR □ □ □	AVIONICS TECH1				
Launch Pad	QUAL CONT. TECH				
	TECHNICAL SUPPORT				
			PROCEDURES		HANGE
TUG INTERFACE: ORBITER	TUG ORIENTA CILITY D HORIZONT			6	3
SPACECRAFT D SC			MANHOURS _	36	9
SOFTWARE REQUIREM					
LPS ORB ON-BOARD COM					
TUG ON-BOARD COM GROUND CONTROL					
OTHER				•	
OPERATIONS:				,	
Seal caniste	r doors and end cap ar	nd establ	ish controlled environ	ment.	
-	-		sfer to pad. Roll int	o PCR	
oay and posi	tion canister for PCR	maring.			
			, %		
REMARKS:					
Hazardous du	e to ordnance, propel?	lants and	transportation.		
COMMODITIES (CONS.)	AARI EC BEOLUBEO	· · · · · · · · · · · · · · · · · · ·			
COMMODITIES/CONSUI	MADLES REQUIRED:				
L		· · ·			

FUNCTION NO:	FUNCTION TI	TLE: Install Canis Payload on Ma	ter with PCR and Place nipulator	3
6.3	<u> </u>			
FUNCTION OBJECTIVE	:			
Install Paylo	oad in PCR.			
SITE LOCATION	TIME TO COMPL	ETE (HRS)	HAZARDOUS	
		MIN5	YESXNO_	
OLF	TEST CONDUCT TEST ENGINEE! PROPULSION TE MECH/STRU/TH AVIONICS TECH	NER 2 6** OR	GROUND SUPPORT EQUIPM LPS	
	QUAL CONT. TE	CH2**	· · · · · · · · · · · · · · · · · · ·	<u> </u>
	TECHNICAL SUI	PPORT		
TUG INTERFACE:		TUG ORIENTATION:	PROCEDURES	NEW CHANGE
ORBITER 🗆 FA	ACILITY E	HORIZONTAL []	MANHOURS .	
SPACECRAFT SC		VERTICAL ☑	WANTOOTIS	
SOFTWARE REQUIREM LPS ORB ON-BOARD CON TUG ON-BOARD CON GROUND CONTROL OTHER	AP 🗆			
Place paylo		open PCR hatch, a	nd verify clean enviro	nment.
REMARKS:				
Hazardous du	e to ordnama	ace, propellant, ho	isting	
COMMODITIES/CONSU	MABLES REQUI	RED:		

FUNCTION NO:	FUNCTION TI	7LE: Remove non-f Remove Canni	light hardware
	<u> </u>		
FUNCTION OBJECTIVE	:		
Verify P/L i	n stowed pos	sition and prepared	l for PCR - Orbiter mate
SITE LOCATION	TIME TO COMPL	ETE (HRS)	HAZARDOUS
ETR 🖾 WTR 🖾	MAX8	MIN4	YES,xNO
OPF OPF TPF SPF PCR ORB ORB	TEST CONDUCT TEST ENGINEER PROPULSION TO MECH/STRU/TH AVIONICS TECH SAFETY ENGINE	EADCOUNT) WER7 OR RS1 ECH1 I TECH2 I1 EER1	GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY) GFE equipment
		CH1	
			PROCEDURES NEW CHANGE
TUG INTERFACE: ORBITER	ACILITY 🗵 [TUG ORIENTATION: HORIZONTAL VERTICAL	PAGES42 MANHOURS246
LPS ORB ON-BOARD CONTUG ON-BOARD CONGROUND CONTROL OTHER OPERATIONS: Establish padeflate canifosition.	MP	tched position with nd lower canister a	n all non-flight hardware removed. and place it in roll-back
REMARKS: Hazardous du	ie to ordnan	ce, propellant and	hoisting
COMMODITIES/CONSU	MABLES REQUI	RED:	

FUNCTION NO:	FUNCTION TI	TLE:	,
6.5	Extend	PCR and Open P/L B	ny Doors
FUNCTION OBJECTIVE			
Extend PCR	to orbiter m	ate position and e	stablish clean environment
SITE LOCATION	TIME TO COMPL		HAZARDOUS
ETR 🖾 WTR 🔀	MAX8	MIN1	YES NO
AREA LOCATION OLF OPF TPF SPF	TEST CONDUCT TEST ENGINEE PROPULSION TO	EADCOUNT) WER 2 TOR ES1_ ECH	GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY)
PCR S3 ORB □	AVIONICS TECH	I EER1	
	QUAL CONT. TE	ECH	
TUG INTERFACE:		TUG ORIENTATION:	PROCEDURES NEW CHANGE PAGES 3 2
	ACILITY 😡	HORIZONTAL D	MANHOURS 18 6
platform and and PCR/orb and open PCI clean enviro	MP	rk platforms, wipe inch PCR into mate	panel seals, lower servicing down orbiter seals, orbiter doors position. Remove work platforms pors open and establish common
REMARKS:			
nazardous du	ue to ordnand	ce, propellant and	movement.
COMMODITIES/CONSU	MABLES REQUI	RED:	

FUNCTION NO:	FUNCTION TI	TLE:				
6.6	Mate Pay	yload with Orbiter				
FUNCTION OBJECTIVE						
Mechanically	mate paylo	ad with orbiter				
						
1	TIME TO COMPL		HAZARDOU			
WTR			YES, X			71
AREA LOCATION	PERSONNEL (H TOTAL MANPO		. 1	JPPORT EQUIPA OTHER 🔲 (SPE		
		OR1	12,00	0111211 12 (01)		
TPF C	PROPULSION T	ECH 1 2**			·	··
PCR 🕄	MECH/STRU/TH AVIONICS TECH	1 TECH 2				
	SAFETY ENGIN	EER 1 2 3**				
		PPORT				
			PROCEDUR		NEW	CHANGE
TUG INTERFACE: OPBITER F	ACILITY 🗆	TUG ORIENTATION: HORIZONTAL 📋		PAGES .	- 0	
SPACECRAFT S		VERTICAL 🖎	<u> </u>	MANHOURS .	10	
SOFTWARE REQUIREM						
ORB ON-BOARD CO	VIP 🗆					
GROUND CONTROL. OTHER	STATION []					•
OPERATIONS:						· · · · · · · · · · · · · · · · · · ·
Extend manip	oulator to ba	ackoff position; al	ign attach	points with	n P/L gui	des,
and verify i	nterface cor	nectors ready for	mate. Inc	h manipulato	or to mat	e
		load Trunnions and arance envelope has				sition.
interface co	nnections.					
		*				
7544 843						
REMARKS: Hazardous du	e to ordnand	ce, propellants and	l movement			
		,				
COMMODITIES/CONSU	MABLES REQUI	RED:				

FUNCTION NO:	FUNCTION T	TLE:	-	
6.7	Payload	-Orbiter Interface	Verification	
FUNCTION OBJECTIVE	E:			
Verify payl	oad-orbiter	interface integrity	,	
SITE LOCATION	ТІМЕ ТО СОМРІ		HAZARDOUS	
ETR 🕅 WTR 🗷	MAX <u>12</u>	MIN3_5	YES, x NO NO	
AREA LOCATION	PERSONNEL (H	EADCOUNT) WER13	GROUND SUPPORT EQUIPMENT	
OLF []	TEST CONDUCT	ror1	LPS (3) OTHER (SPECIFY)	
OPF [] TPF []	TEST ENGINEE PROPULSION T	RS2	P-009	
SPF □ PCR 図	MECH/STRU/TH AVIONICS TECH			
PCR ⊠ ORB □	AVIONICS TECH SAFETY ENGIN	1 <u>4</u>		
	SAFETY ENGIN QUAL CONT. TI			<u></u>
	TECHNICAL SU	PPORT	DDOCEDURES AIGM	CHANCE
TUG INTERFACE:	<u> </u>	TUG ORIENTATION:	PROCEDURES NEW PAGES 15	
ORBITER 🖸 F	ACILITY 🗆	HORIZONTAL	MANHOURS 90	24
SPACECRAFT S		VERTICAL 🖫	WANTOOTIS	
LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	DMP 🗆			
OPERATIONS:				
orbiter int checks and facility in to address	erface from inspection of terface. A and verify ration purge.	facility interface n each electrical o pply power to the ! esponse to each P/1	ant/pressurant line crossing to adapter valves. Perform connector at the orbiter and fug primary bus. Utilize the computer. Establish properties orbiter/facility interested	n continuity d he LPS ellant
REMARKS:				
Hazardous d	ue to ordnan	ce and propellants		
COMMODITIES/CONSU	JMABLES REQUI	RED:		
<u> </u>				

FUNCTION NO:	FUNCTION TI	TLE:		
6.8	Payload	Measurement Profil	e	
FUNCTION OBJECTIVE				
Establish pre	e-launch dat	a baseline profile		
1	TIME TO COMPL		HAZARDOUS	
ETR & V	MAX2	MIN 0.1	YES. x NO.	
] -	PERSONNEL (HI	EADCOUNT) WER5	GROUND SUPPORT EQUIPMENT LPS 図 OTHER □ (SPECIFY)	
OLF	TEST CONDUCT	OR RS1	2.0 E (6.20). 17	
TPF []	PROPULSION TO	ECH		
PCR □	AVIONICS TECH	TECH		
ORB 121	SAFETY ENGIN	EER 1		
		PPORT		
			PROCEDURES NEW	CHANGE
TUG INTERFACE: ORBITER FA	ACILITY O	TUG ORIENTATION: HORIZONTAL []		1
SPACECRAFT SC		VERTICAL M	MANHOURS12	3
SOFTWARE REQUIREM				
LPS ORB ON-BOARD COM				
TUG ON-BOARD CON GROUND CONTROL				
OTHER	ō			
OPERATIONS:				
Power up the	complete pa	ayload and record t	he ambient end instrument profil	es.
REMARKS:				
Hazardous du	e to ordner	ace and propellants		
COMMODITIES/CONSUM				
COMMODITIES/COMSON	MWDEE9 NEUUI	NEU:		

FUNCTION NO:	FUNCTION TITLE:	
6.9	Orbiter - P/L Functiona	1 Interface Systems Test
FUNCTION OBJECTIV	E:	
Verify that	the P/L and Orbiter are rea	dy to support the mission,
SITE LOCATION	TIME TO COMPLETE (HRS)	HAZARDOUS
ETR 🖾 WTR 🕦	MAX 8 MIN 3	YES, x NO
AREA LOCATION	PERSONNEL (HEADCOUNT)	GROUND SUPPORT EQUIPMENT
OLF [TOTAL MANPOWER 12 TEST CONDUCTOR 1	- LPS ₺ OTHER □ (SPECIFY)
OPF 🗆	TEST ENGINEERS 2	
TPF D	PROPULSION TECH 2	
SPF □ PCR □	MECH/STRU/TH TECH	
ORB &	AVIONICS TECH4 SAFETY ENGINEER1 OUAL CONT. TECH2	_
	QUAL CONT. TECH 2	
	TECHNICAL SUPPORT	
·		PROCEDURES NEW CHANGE
TUG INTERFACE:	TUG ORIENTATION:	PAGES
ORBITER 23 SPACECRAFT S		MANUOLIDO 20
SOFTWARE REQUIRE		
LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	図 DMP ロ DMP ロ	
OPERATIONS:		
landing.	abbreviated mission sequence	test from launch through orbiter
Hazardous d	lue to ordnance and propellan	IES
COMMODITIES/CONST	JMABLES REQUIRED:	
1		

FUNCTION NO:	FUNCTION T	TLE:			
6.10	Remov	Remove non-Flight Hardware			
FUNCTION OBJECTIVE	E :				
Prepare for	PCR-Orbiter	Mate			
SITE LOCATION	TIME TO COMPI	ETE (HRS)	HAZARDOUS		
ETR IS	MAX5	MIN_3	YES NO.	<u>x</u>	
AREA LOCATION OLF OPF TEST CONDUCT	EADCOUNT) WER 2 FOR RS1 ECH	GROUND SUPPORT EQUIPMENT OTHER (SP			
PCR 🗵	AVIONICS TEC	-1	/		
ORB 🗆		EER			
		PPORT		······································	
TUG INTERFACE:		TUG ORIENTATION:	PROCEDURES	NEW 1	CHANGE 1
	ACILITY D	HORIZONTAL D	MANHOURS		3
	IMP	are from Tug and S	spacecraft as required		
REMARKS:					
COMMODITIES/CONSU	JMABLES REQU	IRED:			

FUNCTION OBJECTIVE: Complete Tug Fressurant Loading and Load Fuel Cell Reactants SITE LOCATION ETR 5 WAX 12 MIN 4 WES X NO AREA LOCATION PERSONNEL HEADDOUNT) OPF TESTONDUCTOR 1 TOTAL MANPOWER 10 OPF TESTONDUCTOR 1 TOPF TESTONDUCTOR 1 TOPF TESTONDUCTOR 1 OPF MECHNSTRUTTH TIGH. ORB E SAFETY ENGINEER 1 OUAL CONT. TECH 1 TECHNICAL SUPPORT VERTICAL MANMOURS 36 9 PROCEDURES NEW CHANGE ORBITAL SOFTWARE DESTONDUCTOR SOFTWARE OF THE SOFTWARE OF TH	FUNCTION NO:	FUNCTION TI	TLE: •				
Complete Tug Pressurant Loading and Load Fuel Cell Reactants SITE LOCATION TIME TO COMPLETE (HRS) HAZARDOUS. WTR B MAX 12 MIN 4 VES X NO AREA LOCATION PERSONNEL (HEADCOUNT) OFF TOTAL MANPOWER 10 TEST CONDUCTOR 7 TEST ENGINEERS 2 PROPULSION TECH 4 SPF MECH-STRUITH TEG: POR MECH-STRUITH TEG: AVIONICS TECH 1 TECHNICAL SUPPORT TUG INTERFACE: QUAL CONT. TECH 1 THE CHRICAL SUPPORT PROCEDURES NEW CHANGE SPACECRAFT SOFTWARE WHO PROVED WERTICAL MANHOURS 36 9 SOFTWARE REQUIREMENTS: UPS MANHOURS 36 9 SOFTWARE REQUIREMENTS: UPS MANHOURS 36 9 OPERATIONS: Complete helium pressurant loading to 3200 psi via orbiter interface. Load fuel cell LH2 and LO2 and top as required. Pressurize main propallant tanks to flight pressure and leak check (decay). REMARKS: Hazardous due to ordnance, propellants and pressures. Purge bag purge must be on.	7.1	Tug Pres	ssurant and Fuel Co	ll Loading			
SITE LOCATION TIME TO COMPLETE (HRS) HAZARDOUS. ETR \$1	FUNCTION OBJECTIVE	:					
STR ED MAX 12 MIN 4 VES X NO	Complete Tug	Pressurant	Loading and Load E	uel Cell Reac	tants		
STR ED MAX 12 MIN 4 VES X NO							
AREA LOCATION PERSONNEL (HEADCOUNT) TOTAL MANPOWER 10 TEST CONDUCTOR 1 TES	l 					,	
OLF		MAX12 [WIN_4	YES X	NO		
AVIONICS TECH	OLF -	TOTAL MANPOV TEST CONDUCT TEST ENGINEER PROPULSION TE	VER 10 OR 3 RS 2 CH 4				<u> </u>
TUGINTERFACE: ORBITER STACILITY HORIZONTAL PAGES 6 3 SOFTWARE REQUIREMENTS: LPS ORB ON-BOARD COMP GROUND CONTROL STATION OTHER OPERATIONS: Complete helium pressurant loading to 3200 psi via orbiter interface. Load fuel cell LH2 and LO2 and top as required. Pressurize main propellant tanks to flight pressure and leak check (decay). REMARKS: Hazardous due to ordnance, propellants and pressures. Purge bag purge must be on. COMMODITIES/CONSUMABLES REQUIRED:	PCR LI	AVIONICS TECH					
TUG ORIETER FACILITY TUG ORIENTATION:		QUAL CONT. TE	CH				
TUGINTERFACE: ORBITER FACILITY		TECHNICAL SUF	PPORT	PROCEDURES		NEW	CHANGE
LPS ORB ON-BOARD COMP GROUND CONTROL STATION OTHER OPERATIONS: Complete helium pressurant loading to 3200 psi via orbiter interface. Load fuel cell LH2 and LO2 and top as required. Pressurize main propellant tanks to flight pressure and leak check (decay). REMARKS: Hazardous due to ordnance, propellants and pressures. Purge bag purge must be on. COMMODITIES/CONSUMABLES REQUIRED:	ORBITER 🖾 FA	ACILITY D	HORIZONTAL	7	PAGES _	6	3
Complete helium pressurant loading to 3200 psi via orbiter interface. Load fuel cell LH ₂ and LO ₂ and top as required. Pressurize main propellant tanks to flight pressure and leak check (decay). REMARKS: Hazardous due to ordnance, propellants and pressures. Purge bag purge must be on. COMMODITIES/CONSUMABLES REQUIRED:	LPS ORB ON-BOARD CON TUG ON-BOARD CON GROUND CONTROL	MP □ MP □ STATION □					
Pressurize main propellant tanks to flight pressure and leak check (decay). REMARKS: Hazardous due to ordnance, propellants and pressures. Purge bag purge must be on. COMMODITIES/CONSUMABLES REQUIRED:	Complete hel				ter inter	face.	
REMARKS: Hazardous due to ordnance, propellants and pressures. Furge bag purge must be on. COMMODITIES/CONSUMABLES REQUIRED:		-	4		leak che	ck (deca	v).
Hazardous due to ordnance, propellants and pressures. Purge bag purge must be on. COMMODITIES/CONSUMABLES REQUIRED:		• •		•		• • • • • •	
Hazardous due to ordnance, propellants and pressures. Purge bag purge must be on. COMMODITIES/CONSUMABLES REQUIRED:							
Hazardous due to ordnance, propellants and pressures. Purge bag purge must be on. COMMODITIES/CONSUMABLES REQUIRED:							
Hazardous due to ordnance, propellants and pressures. Purge bag purge must be on. COMMODITIES/CONSUMABLES REQUIRED:							
Hazardous due to ordnance, propellants and pressures. Purge bag purge must be on. COMMODITIES/CONSUMABLES REQUIRED:							
Hazardous due to ordnance, propellants and pressures. Purge bag purge must be on. COMMODITIES/CONSUMABLES REQUIRED:							
Hazardous due to ordnance, propellants and pressures. Purge bag purge must be on. COMMODITIES/CONSUMABLES REQUIRED:	REMARKS.		<u>, , , , , , , , , , , , , , , , , , , </u>				······
	Hazardous du	e to ordnanc	e, propellants and	pressures.	Purge bag	purge m	ust
	t .		RED:	, , , , , , , , , , , , , , , , , , , ,		,,,,	

FUNCTION NO:	FUNCTION T	ITLE:			
7.2	Countdo	m			
FUNCTION OBJECTIVE	<u> </u>				
Load Tug F	ropellants				
O'TE (COATION)	TIME TO BOMB	LETE MIDES	LIAZA DOUG		
ETR 🖸	TIME TO COMPI	MIN_1	HAZARDOUS YES. x NO		
WIRE			GROUND SUPPORT EQUIP		
OLF []	PERSONNEL (H TOTAL MANPO	WER11	LPS E OTHER [] (SF		
OPF 🖸	TEST ENGINEE	TOR1 RS3			
TPF	PROPULSION T	ECH3			
		H TECH			
	QUAL CONT. TE	ECH			
	TECHNICAL SU	PPORT	PROCEDURES	NEW	CHANGE
TUG INTERFACE:		TUG ORIENTATION:	⊣	17	9
ORBITER & F.	ACILITY 🔘 DFTWARE 🗓	HORIZONTAL [] VERTICAL	MANHOURS		27
SOFTWARE REQUIREN	_				·
LPS ORB ON-BOARD COI TUG ON-BOARD COI					
GROUND CONTROL OTHER					
OPERATIONS:					·
Cooldown Tug to full then		nd slow fill, rapid	fill to upper sensor	, slow fill	L
	-		•		
Cooldown Tug to full then		d slow fill, rapid	fill to upper sensor	, slow fill	Ĺ
	- · · · · ·				
REMARKS:					
Hazardous du Purge bag pu		ants, ordnance and on.	pressures.		
COMMODITIES/CONSUI	MABLES REQUI	RED:			
LO ₂	, LH ₂				

FUNCTION NO:	FUNCTION TI	FUNCTION TITLE:			
7.3	Terminal	Terminal Countdown and Launch			
FUNCTION OBJECTIVE	E:				
Launch Shutt	:1e				
SITE LOCATION	тіме то сомрі	LETE (HRS)	HAZARDOUS		
ETR 😡 WTR 😡	MAX <u>4</u>	MIN	YES X NO		
AREA LOCATION OLF OPF TPF	PERSONNEL (HEADCOUNT) TOTAL MANPOWER 6 TEST CONDUCTOR 1 TEST ENGINEERS 3 PROPULSION TECH		GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY)		
SPF □ PCR □	MECH/STRU/TH	1 TECH		- 	
ORB 🕄	SAFETY ENGIN	EER 1	:		
		PPORT			
			PROCEDURES NEW	CHANGE	
TUGINTERFACE: ORBITER	ACILITY []	TUG ORIENTATION: HORIZONTAL	PAGES _20	_10	
SPACECRAFT D S		VERTICAL 🖺	MANHOURS 120	_30	
SOFTWARE REQUIRED LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	MP 🗆				
OPERATIONS:					
			ff to verify "GO" condition.		
For engineer abbreviated	ing model mo launch count	onitor Tug critical Edown to verify int	parameters through erfaces and software.		
		-			
REMARKS:				<u> </u>	
Hazardous du	e to propell	lant, ordnance and	pressures		
COMMODITIES/CONSU	MABLES REQUI	RED:		,,	
LH ₂ , LO ₂					

· 多多的,我们就是我们的,我们就是我们的,我们就是一个人的,我们就是我们的,我们就是我们的,我们就会会说,我们的,我们是我们的,我们的,我们们的,我们们们们的

FUNCTION NO:	FUNCTION TITLE:				
7.4*	Offload	and Purge Cryogeni	c Systems		
FUNCTION OBJECTIVE Safe Tug eng from Orbiter	ineering mod	lel propellant and	fuel cell systems for removal		
ETR ☑ WTR □	TIME TO COMPI	MIN4	HAZARDOUS YES X NO NO		
OLF OPF TEST CONDUCT TEST ENGINEE PROPULSION TO MECH/STRU/TH AVIONICS TECH SAFETY ENGIN QUAL CONT. TE	WER 11* FOR 1* RS 3* ECH 3* H TECH 2* EER 1*	GROUND SUPPORT EQUIPMENT LPS M OTHER (SPECIFY)			
			PROCEDURES NEW	CHANGE	
	TUG INTERFACE: TUG ORIENTATION: PAGES 17 9				
SOFTWARE REQUIREN LPS ORB ON-BOARD CON TUG ON-BOARD CON GROUND CONTROL OTHER	MP [] MP []			,	
OPERATIONS: Dump LO ₂ and specified sa	LH ₂ , purge fety limits	cryogenic system u	intil concentrations are withi	in	
REMARKS:	<u></u>				
Hazardous du * Engineerin					
COMMODITIES/CONSU	MABLES REQUI	RED:			

FUNCTION NO:	FUNCTION T	TLE:			
7.5*	Remove	Remove Payload from Orbiter Bay			
FUNCTION OBJECTIVE Verify abili		e a payload from t	ne Orbiter		
1	TIME TO COMPI		HAZARDOUS YES, x NO		
AREA LOCATION OLF OPF TPF SPF PCR	PERSONNEL (H TOTAL MANPO TEST CONDUCT TEST ENGINEE PROPULSION T MECH/STRU/TH AVIONICS TECH	WER9* FOR2* ECH	GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY)		
	SAFETY ENGIN QUAL CONT. TE	CH2*			
	TECHNICAL SU	PPORT	PROCEDURES NEW CH	-IANGE	
TUG INTERFACE: ORBITER D F SPACECRAFT D S	ACILITY D	TUG ORIENTATION: HORIZONTAL VERTICAL R	PAGES MANHOURS12	<u>2</u> 6	
SOFTWARE REQUIREM LPS OR8 ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER OPERATIONS: Extend PCR, platforms, to	MP	r bay doors and ve ator to payload.	rify seal. Install work		
REMARKS: * Engineeri	ng model onl	у			
COMMODITIES/CONSU	MABLES REQUI	RED:			

FUNCTION NO:	FUNCTION TI	ITLE:			
7.6*	Install	Install Engineering Model in Canister			
FUNCTION OBJECTIVE	<u></u>				
Remove paylo	ad from Orb	iter and move to T	PF		
3,77, 60, 7,00			T		
	TIME TO COMPL	LETE (HRS) MIN2	HAZARDOUS YES. x NO NO		
WTR					
AREA LOCATION	PERSONNEL (H TOTAL MANPO	IEADCOUNT) WER2*	GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY)		
OLF []	TEST CONDUCT	TOR RS1*	Canister and Transporter		
TPF 🗆	PROPULSION T	ECH	Odnizotek dire zidile per tez		
PCR ☑		H TECH. 1*			
ORB []	SAFETY ENGIN	IEER			
		PPORT			
			PROCEDURES NEW CHAI		
TUG INTERFACE:	ACILITY 🖼	TUG ORIENTATION: HORIZONTAL	PAGES		
SPACECRAFT D S		VERTICAL (2)	MANHOURS <u>36</u> <u>12</u>	<u> </u>	
SOFTWARE REQUIRED LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	MP				
OPERATIONS:					
PCR, mate ca	mister to PO	CR, load payload i	y doors, seal and retract n canister, seal canister and PCR and move to TPF.		
Hazardous du		= :			
* Engineerir	ig model only	у			
COMMODITIES/CONSU	MABLES REQUI	RED:			

NASS :1011 8-74 (PRELIMINARY)

FUNCTION NO:	FUNCTION T	ITLE:			
7.7*	Remove Payload from Canister				
FUNCTION OBJECTIV	E:				
Remove Engin	eering Model	from Canister			
SITE LOCATION	TIME TO COMP		HAZARDOUS		
ETR 23 WTR□	MAX8	MIN	YESNO		
AREA LOCATION OLF OPF	PERSONNEL (H TOTAL MANPO TEST CONDUC TEST ENGINEE	WER	GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY) _Canister, H-031		
TPF KO SPF □		ECH4*	January II. 002		
PCR ORB	AVIONIC3 TECH SAFETY ENGIN	HIEER1*			
	QUAL CONT. TI	ECH*			
			PROCEDURES NEW		
	ACILITY 🗆	TUG ORIENTATION: HORIZONTAL	PAGES 2		
SPACECRAFT D S SOFTWARE REQUIRE		VERTICAL IX	MANHOURS12		
LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	MP 🗆				
OPERATIONS:	, , , , , , , , , , , , , , , , , , ,				
Connect cani	ster to airl	ock. open doors. a	ttach manipulator to Tug,		
		in workstand. Re			
REMARKS: * Engineerin					
, migineerin	g moder only				
COMMODITIES/CONSU	MABLES REQUI	RED:		······································	

FUNCTION NO:	FUNCTION T	ITLE:		
7.8*		Service Engineerin	g Model Cryo Tanks	
FUNCTION OBJECTIVE	:			
Safe Systems	3			
1 4	TIME TO COMPI		HAZARDOUS	
WTR 🗆	MAX	MIN	YES, X NO	
OFF D TPF SD SPF D	PROPULSION T	WER 5* TOR 1* ECH 2* TECH 5*	GROUND SUPPORT EQUIPMENT LPS □ OTHER ₺ (SPECIFY) P-002	
PCR □ ORB □	AVIONICS TECH			
	QUAL CONT. TE	ECH1*		
	TECHNICAL SU	PPORT	PROCEDURES NEW	CHANGE
TUG INTERFACE: ORBITER	ACILITY 🗆	TUG ORIENTATION: HORIZONTAL	PAGES 4	2
SPACECRAFT SI SOFTWARE REQUIREN		VERTICAL 🗵	MANHOURS <u>24</u>	6
LPS ORB ON-BOARD COI TUG ON-BOARD COI GROUND CONTROL OTHER	MP 🗆			
OPERATIONS:				
Connect cryc Pressurize t	servicing canks to 19	GSE. Purge LH $_2$ and \pm 1 psia and löck $\mathfrak t$	I LO ₂ tanks and verify empty. 1p. Disconnect GSE.	
REMARKS:				
Hazardous be *Engineering		opellant		
COMMODITIES/CONSU	MABLES REQUI	RED:		

FUNCTION NO:	FUNCTION T	ITLE:			
7.9*		Move payload to Second Checkout Gell Workstand			
FUNCTION OBJECTIV	E:				
Position pa	yload in sec	ond checkout cell	to perform GSE verification		
	r			·····	
SITE LOCATION ETR &	TIME TO COMP	LETE (HRS) MIN 3	HAZARDOUS		
WTR	ļ		YES, X NO		
AREA LOCATION	PERSONNEL (H TOTAL MANPO TEST CONDUC	NER	GROUND SUPPERT EQUIPMENT LPS □ OTHER ☑ (SPECIFY)		
OLF []	TEST CONDUC	TOR	CFS D OTHER EN (SPECIFY)		
TPF 😡	PROPULSION T	RS	н-31		
SPF	MECH/STRU/TH	1 TECH_ 6*			
ORB D	AVIONICS TECH SAFETY ENGIN	1550 l*			
	QUAL CONT. TI	ECH			
	TECHNICAL SU	PPORT			
TUG INTERFACE:	1	TUG ORIENTATION:	PROCEDURES NEW CHA	NGE	
	FACILITY 13	HORIZONTAL []			
SPACECRAFT : SOFTWARE REQUIRE		VERTICAL [3	MANHOURS 18 6		
ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTRO OTHER OPERATIONS:	DMP	ug hard points; mo	ve payload to second cell and instal	1.	
	ng model onl				

FUNCTION NO:	FUNCTION TI	TLE:	1		
7.10*		Verify Payload/GSE Interface			
FUNCTION OBJECTIV	E:				
Verify GSE	interfaces a	re identical to t	hose of other checkout cell		
SITE LOCATION ETR 🖾	TIME TO COMPL	,	HAZARDOUS YESNOX		
WTR ☐ AREA LOCATION	PERSONNEL (H		GROUND SUPPORT EQUIPMENT		
OLF 🗆	TOTAL MANIPO	MER 10*	LPS _ OTHER _ (SPECIFY)		
OPF 🗆	TEST ENGINEE	110,			
TPF (2) SPF (2)	PROPULSION TO MECH/STRU/TH	GUN			
PCR □ ORB □	AVIONICS TECH				
	SAFETY ENGIN QUAL CONT. TE	CH2*			
	TECHNICAL SU	PPORT			
TUG INTERFACE:	l	TUG ORIENTATION:		ANGE	
	ACILITY 🖺	HORIZONTAL 🖂	MANHOURS 24 6		
SOFTWARE REQUIRE		VERTICAL 😡		———	
LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	OMP []				
stands, har	ndling equipm		lines; position GSE (platforms, fy interfaces. Disconnect all GSE		
		•	·		
REMARKS:					
* Engineer:	ing model onl	.у.			
COMMODITIES/CONSU	JMABLES REQUI	RED:			

FUNCTION NO:	FUNCTION TI	TLE:		· · · · · ·
7.11*	1	Remove Spacecraft 1	Mechanical Simulator	
FUNCTION OBJECTIVE	Ξ:			
Demate spac	ecraft simul	ator and Tug		
SITE LOCATION ETR 钇 WTR 函	TIME TO COMPL		HAZARDOUS YES, X NO NO NO NO NO NO NO NO NO NO NO NO NO	
AREA LOCATION OLF OPF TPF SPF ORB ORB	AVIONICS TECH SAFETY ENGIN QUAL CONT, TE	WER 5* OR 1* ECH 2*	GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY) H-019, H-026, A-001 PROCEDURES NEW	CHANGE
TUG INTERFACE:	ACILITY	TUG ORIENTATION:	PAGES12_	6
ORBITER D F SPACECRAFT D S		HORIZONTAL ☐ VERTICAL ☐	MANHOURS72	18
	MP		. Mechanically demate spacecraft away from Tug.	
REMARKS:			· · · · · · · · · · · · · · · · · · ·	
	ue to hoistin ng model only	_		
COMMODITIES/CONSU	MABLES REQUII	RED:		

FUNCTION NO:	FUNCTION TI	TLE:			
7.12*		Demate Tug from Kick Stage			
FUNCTION OBJECTIVE	<u>:</u>				
Demate engi	neering mode	l Tug mechanically	from Kick Stage.		
	4-	<u> </u>	-		
0.75100.750	TIME TO 004121	ETE (LIDE)	HAZARDOUS		
SITE LOCATION ETR (3)	TIME TO COMPL	ETE (HRS) MIN2	YES X NO NO		
WT/R 🗆			GROUND SUPPORT EQUIPMENT		
AREA LOCATION		WER6	LPS OTHER (SPECIFY)		
OLF []	TEST CONDUCT	FORRS1			
TPF &		ECH			
SPF □ PCR □	MECH/STRU/TH AVIONICS TECH	HTECH2		····	
ORB 🗆	SAFETY ENGIN	EER1			
	TECHNICAL SU	ECH1PPORT			
			PROCEDURES NEV	V CHANGE	
TUG INTERFACE:	. A OLUTY P	TUG ORIENTATION:	.	3	
ORBITER D F SPACECRAFT D S	ACILITY B	HORIZONTAL [3]	MANHOURS30_	9	
SOFTWARE REQUIRE	MENTS:				
LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	MP 🗆				
OPERATIONS:	<u></u>				
Attach over	head crane t Lift Kick St	o stage; position age from Tug and p	pin pullers to the retracte lace in Kick Stage adapter.	ed	
REMARKS:					
	ue to hoisti ng model onl	ng operations. y			
COMMODITIES/CONSU	JMABLES REQU	IRED:			

FUNCTION NO:	FUNCTION TITLE:					
7.13*		Separate Tug from	Adapter			
FUNCTION OBJECTIVE:						
Remove deploy	yment adapto	er from Tug for sh	ip to WTR.			
SITE LOCATION T	TME TO COMPL	ETE (HRS)	HAZARDOUS.		<u> </u>	
ETR 🗗 🛝	1AX <u>4</u>	MIN2	YES,x_	NO		
OLF CONTROL OF CONTROL	PERSONNEL (HEADCOUNT) TOTAL MANPOWER 5 TEST CONDUCTOR TEST ENGINEERS 1 PROPULSION TECH 2 AVIONICS TECH 2 SAFETY ENGINEER 1		GROUND SUPPOR			
	QUAL CONT. TE	CH				
	FECHNICAL SU	PPORT	PROCEDURES		NEW	CHANGE
				PAGES	20	9
arms to adap Mechanically	IP	pter doll; under a adapter-orbiter in pter from Tug inte pter for inspectio	terface attach rtank skirt and	ment fill d lower d	ings.	
REMARKS: Hazardous du * Engineerin						,
COMMODITIES/CONSUM	AABLES REQUI	RED:				

FUNCTION NO:	FUNCTION TITLE:				
7 - 14*		Remove Ship-Loose Equipment			
FUNCTION OBJECTIVE	;				
Prepare EM i	for ship to	WTR			
	TIME TO COMPI	LETE (HRS)	HAZARDOUS		
ETR 🖸	MAX	MIN10	YES, NO X		
OLF OPF TPF 🔯	PERSONNEL (HEADCOUNT) TOTAL MANPOWER 8 TEST CONDUCTOR TEST ENGINEERS 2 PROPULSION TECH 1		GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY)		
1 311	MECH/STRU/TE	1 TECH2			
] ORB □	SAFETY ENGIN	EER2			
	TECHNICAL SU	PPORT			
THE INTERFACE.		TUG ORIENTATION:	PROCEDURES NEW		
	ACILITY 🗀	HORIZONTAL 🗆	PAGES		
SPACECRAFT SO		VERTICAL 🔯			
LPS ORB ON-BOARD COME TUG ON-BOARD COME GROUND CONTROL OTHER	MP 🖸				
OPERATIONS:					
Fleatrically	, and mechan	ically disconnect	all ship-loose components from		
the model	And meenan	disconnect i	all salp loose components from		
REMARKS:					
* Engineerin	ng model onl	у			
COMMODITIES/CONSU	MABLES REQUI	RED:			

FUNCTION NO:	FUNCTION TITLE:				
7.15*	,	Visual external damage inspection			
FUNCTION OBJECTIVE	:				
Visual inspe	ction of de	signated areas in p	preparation for shipment to		
SITE LOCATION	TIME TO COMPL	_ETE (HRS)	HAZARDOUS		
ETR [] WTR [3]	MAX	MIN2	YES, NOX		
OLF 口 OPF 哲 TPF 口	AREA LOCATION PERSONNEL (HEADCOUNT) TOTAL MANPOWER 7 OLF C TEST CONDUCTOR OPF E TEST ENGINEERS 1 TPF C PROPULSION TECH 2		GROUND SUPPORT EQUIPMENT LPS OTHER () (SPECIFY)		
1 , 0,,,	AVIONICS TECH	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
ORB 🗆	SAFETY ENGIN QUAL CONT. TE	EER			
1	GOAL OUNT, IL	PPORT			
			PROCEDURES NEW CHANGE		
TUG INTERFACE: TUG ORIENTATION:			PAGES <u>4</u> 2		
ORBITER DF.	ACILITY OFTWARE	HORIZONTAL Da VERTICAL □	MANHOURS 24 6		
LPS ORB ON-BOARD CONTUG ON-BOARD CONGROUND CONTROLOTHER OPERATIONS:	MP	e inspection of ex	terior surfaces as follows:		
Deployment	adapter, fo	rward skirt, LH ₂ ma	ain shell and intertank skirt:		
REMARKS:					
* Engineerin	ng model onl	у			
COMMODITIES/CONSU	MABLES REQUI	RED:			

FUNCTION NO:	FUNCTION TITLE:			
Ref 1	Shuttle Flight Operations			
FUNCTION OBJECTIVE	<u> </u>			
	Mission Ope			
	ritssion ope	rations		
SITE LOCATION	TIME TO COMPL	LETE (HRS)	HAZARDOUS	
I === - 1		MIN	YES NO	
	PERSONNEL (H		GROUND SUPPORT EQUIPMENT	
OLF []	TEST CONDUCT	WER FOR	LPS OTHER (SPECIFY)	
OPF []	TEST ENGINEE PROPULSION T	RS ECH		
SPF □	AVIONICS TECH	HTECH		
	QUAL CONT. TE	ECH		
		PPORT	PROCEDURES NEW	CHANCE
TUG INTERFACE:		TUG ORIENTATION:	PROCEDURES NEW PAGES	
ORBITER ☐ F SPACECRAFT ☐ S	ACILITY OFTWARE	HORIZONTAL VERTICAL	MANHOURS	
SOFTWARE REQUIREN	MENTS:			
ORB ON-BOARD COI	MP 🗀			
GROUND CONTROL OTHER	STATION [
OPERATIONS:				
R	teference Onl	ly		
•				
REMARKS:				
COMMODITIES/CONSU	MABLES REOU	BED:		

FUNCTION NO:	FUNCTION TI	TLE:		1
Ref 2	Orb	oiter Landing at Sl	IA.	
FUNCTION OBJECTIVE				
	Orbiter Lar	nding		
SITE LOCATION ETR ☑	TIME TO COMPL		HAZARDOUS	
WTR	MAX	MIN	YES NO	
AREA LOCATION	PERSONNEL (H	EADCOUNT) WER	GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY)	
OLF 图 OPF □	TEST CONDUCT	OR	ļ	
TPF C	PROPULSION TO	RS ECH		
PCR 🗍	AVIONICS TECH	HTECH		
C 🗆	SAFETY ENGIN	EER		
		PPORT		
TUG INTERFACE:		TUG ORIENTATION:	PROCEDURES NEW PAGES	1
ORBITER D I	FACILITY O	HORIZONTAL VERTICAL	MANHOURS	
SOFTWARE REQUIRE		VENTIONE [· ·
LPS ORB ON-BOARD CO				
TUG ON-BOARD CO	OMP			
OTHER	Ö			
OPERATIONS:				
Re	eference Only			!
	sterence only			
REMARKS:				
Noi	n-Tug Functio	n		
COMMODITIES/CONS	UMABLES REQU	IRED:		
		n/A		

FUNCTION NO:	FUNCTION TITLE:				
Ref 3	Safety	Verification and	Crew Exchange		
FUNCTION OBJECTIVE					
Verify Pay	load and Or	biter Systems are	in a safe condition.		
	FIME TO COMPL		HAZARDOUS		
WTRE	MAX	MIN_1.0	YESNO		
j-	PERSONNEL (H TOTAL MANPO	EADCOUNT) WER	GROUND SUPPORT EQUIP		
OLF E	TEST CONDUCT	ror		25% 17	
TPF □		RS			
SPF L	MECH/STRU/TH	1 TECH	l		
1 000 0					
		ECH			
	TECHNICALSU	PPORT	PROCEDITATE.	NEW	CHANGE
TUG INTERFACE:		TUG ORIENTATION:	PROCEDURES	14EV4	
	ACILITY D	HORIZONTAL [¾ VERTICAL □	i	·	
SOFTWARE REQUIREM				·· -*	
LPS ORB ON-BOARD CON TUG ON-BOARD CON GROUND CONTROL	1P 🗀				
OPERATIONS:					
Orbiter flight crew makes a final check and monitors/controls to ensure all Payload Caution and Warning parameters are within limits prior to egress. Crew verifies propellant tank integrity, ordnance circuits electrically safe, and pressures/hazardous fluids at safe level. Flight crew also initiates and verifies the transfer of control of Tug functions to Ground Control. REMARKS:					
TIE (III VIII)					
COMMODITIES/CONSUM	ABLES REQUI	RED: N/A			

FUNCTION NO:	FUNCTION TI	TLE:			
Ref 4	Tow	Tow Orbiter to OPF			
FUNCTION OBJECTIVE	:				
Move Or	rbiter from :	landing field to O	biter Processing Facility (OPF)		
SITE LOCATION	TIME TO COMPL	ETE (HRS)	HAZARDOUS		
ETR 🖾 WTR 🔉	MAX <u>2.0</u>	MIN_1.0	YES,X NO		
AREA LOCATION PERSONNEL (HEADCOUNT) N/A TOTAL MANPOWER OPF & TEST CONDUCTOR TEST ENGINEERS TPF PROPULSION TECH SPF MECH/STRU/TH TECH		WER TOR RS ECH	GROUND SUPPORT EQUIPMENT LPS () OTHER () (SPECIFY)		
PCR □ ORB □		1			
	QUAL CONT. TO	PPORT			
	TECHNICAL 30	11001	PROCEDURES NEW CHANGE		
TUG INTERFACE: TUG ORIENTATION: PAGES ORBITER					
SOFTWARE REQUIRED LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	MP				
temperature pressure in instrumenta	e variations ategrity of	. During this per:	tank pressures during post landing lod, also verify post landing ross terms available with flight		
REMARKS:					
Non-T	ug Function				
COMMODITIES/CONSU	IMABLES REQU	RED: N/A			

FUNCTION NO:	FUNCTION T	ontoad orbi	ter Propellant, Fuel Cells, Ven d Safe Systems	t.
FUNCTION OBJECTIV	/Ε:			
	Safe Orbite	r		
SITE LOCATION	TIME TO COMP	LETE (HRS)	HAZARDOUS	
ETR 🖾 WTR 🔀	MAX <u>16</u>	MIN 8.5	YESX NO	
AREA LOCATION OLF OPF TPF SPF	TOTAL MANPO TEST CONDUCTEST ENGINEE PROPULSION T	EADCOUNT) N/A WER FOR RS ECH	GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY)	
PCR DORB D	AVIONICS TECH SAFETY ENGIN QUAL CONT. TE	TECHEERECHPPORT		
			PROCEDURES NEW	CHANGE
TUG INTERFACE: ORBITER 記 SPACECRAFT □	FACILITY	TUG ORIENTATION: HORIZONTAL 2 VERTICAL	PAGES	
SOFTWARE REQUIRE LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTRO OTHER	OMP OMP			
hydrogen t	Payload Bay p anks require to a burn sta	venting, the Orbi	vapor detection. If Tug er H ₂ vent for Tug will be	
		ached to Tug prope	llant systems via the Orbiter	
	-			
COMMODITIES/CONSU	JMABLES REQUI	HED:		
N/A				

FUNCTION NO:	FUNCTION TITLE:				
Ref 6	Install GSE, Open Payload Bay Doors				
FUNCTION OBJECTIVE	E :	· · · · · · · · · · · · · · · · · · ·			
SITE LOCATION ETR 3	TIME TO COMP	LETE (HRS) MIN5	HAZARDOUS AND		
WTR (3)			YES, X NO		
AREA LOCATION	PERSONNEL (H TOTAL MANPO	EADCOUNT) WER	GROUND SUPPORT EQUIPMENT LPS		
OLF 🖸	TEST CONDUCT	ror			
TPF 🗆	PROPULSION T	ECH			
SPF 🗆 PCR 🗆		1 TECH			
ORB 🗆	SAFETY ENGIN	EER			
		PPORT			
			PROCEDURES NEW	CHANGE	
TUG INTERFACE: ORBITER	ACHITY []	TUG ORIENTATION: HORIZONTAL 🖼	PAGES		
SPACECRAFT S		VERTICAL	MANHOURS		
SOFTWARE REQUIRED					
ORB ON-BOARD CO					
TUG ON-BOARD CO GROUND CONTROL					
OTHER		· · · · · · · · · · · · · · · · · · ·			
OPERATIONS:					
_				,	
Vent pres	sure systems	s to sole level if	required		
				1	
			•		
DEMARKS					
REMARKS:					
	i				
COMMODITIES/CONSU	MARIES REQUI	REC:			
551111102711130	MUDEED HEAD!	11 56 5			

FUNCTION NO:	FUNCTION TIT	LE:	,	
Ref. 7	Flight Abort			
FUNCTION OBJECTIVE	;			
				!
			_	
rar	TIME TO COMPLE		HAZARDOUS	
WTR DE	MAX M	1N	YES,	
AREA LOCATION	PERSONNEL (HEA	ADCOUNT) ER	GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY)	
OLF []	TEST CONDUCTO	R	LF3 D OTHER D (SPECIFT)	
TPF 🗆	PROPULSION TEC	S		
SPF □ PCR □		rech		
ORB 🗆	SAFETY ENGINES	ER		
		PORT		
		10.001511717101	PROCEDURES NEW	
ORBITER F	TUG INTERFACE: TUG ORIENTATION: ORBITER			
SPACECRAFT S		VERTICAL []	MANHOURS	
SOFTWARE REQUIREM				
ORB ON-BOARD CO	MP 🔲			
GROUND CONTROL OTHER	STATION []			
OPERATIONS:				· · · · · · · · · · · · · · · · · · ·
Reference (Only.			
ļ				
	 			
REMARKS:				
COMMODITIES/CONSU	MABLES REQUIRE	ED:		
		- · ·		

FUNCTION NO:	FUNCTION TITLE:			
Ref. 8	Orbiter Landing at SHA			
FUNCTION OBJECTIV	E:			
Land Safel	у			
:				
SITE LOCATION	TIME TO COMP	LETE (HRS)	HAZARDOUS	
ETR (X WTR (X	MAX	MIN	YES NO	
AREA LOCATION	PERSONNEL (I-		GROUND SUPPORT EQUIPMENT	
OLF [WERTOR	LPS OTHER (SPECIF	Y)
OPF []	TEST ENGINEE	RS ECH		
SPF 🗀	MECH/STRU/TI	H TECH	1	
PCR □ ORB.□	AVIONICS TEC	H VEER	<u></u>	
	QUAL CONT. T	ECH		
	TECHNICAL SU	JPPORT	2222221222	CIV. CIV.NOT
TUG INTERFACE:		TUG ORIENTATION:	PROCEDURES NI	EW CHANGE
	ACILITY [HORIZONTAL D		
SOFTWARE REQUIRE		VERTICAL D		
LPS				
ORB ON-BOARD CO	MP 📋			
GROUND CONTROL OTHER	STATION 🗆			
OPERATIONS:			, , <u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>	
Reference	Only.			
REMARKS:				
Non-Tug	Function			
COMMODITIES/CONSU	IMABLES REQUI	IRED:		**************************************

是这个人的一个人,我们就是一个人的一个人的,我们就是一个人的,我们的一个人的一个人的,我们也会会一个人的一个人的,我们也会会会会会会会会会会会会会会会会会会会会

	1	TLE:			
fef. 9	Safe Systems and Connect Ground Cooling				
FUNCTION OBJECTIVE:					
Electrically	v Safe Tuo :	Systems			
2200220022	, 5516 165	5 y 5 C 0 c			
	TIME TO COMPL		HAZARDOUS		
WTRIX	MAXX	MIN5	YES. X	NO	
 	PERSONNEL (H	EADCOUNT) WER	GROUND SUPPORT EQ		
OLF 🖺	TEST CONDUCT	TOR	LPS [] OTHER LI	(SPECIFI)	
	TEST ENGINEE PROPULSION T	RS ECH			
SPF U	MECH/STRU/TH	I TECH			
[
	QUAL CONT. TE	ECH			
	FLIGHT CREW	PPORT	PROCEDURES	NIE/M	CHANGE
TUG INTERFACE:		TUG ORIENTATION:	- {	GES	
ORBITER ☼ FA SPACECRAFT □ SO	ACILITY []	HORIZONTAL 🔥	MANHOURS		
SOFTWARE REQUIREM		VENTIONE LI			
LPS ORB ON-BOARD COM TUG ON-BOARD COM GROUND CONTROLS OTHER	/IP				
OPERATIONS:					
	Tug Systems	electrically safe	d.		
REMARKS:			A7		
Hazardous b functions.	ecause of p	ropellant in bay.	Non-Tug ground ope	erations	
COMMODITIES/CONSUM	MABLES REQU	IRED:			-
N/A					

FUNCTION NO:	FUNCTION T	FUNCTION TITLE:			
Ref 10	Deliv	Delivery to Shuttle Airfield			
FUNCTION OBJECTIVE	E:				
Transport	Tug from man	ufacturing facility	y to KSC.		
SITE LOCATION	TIME TO COMPI	LETE (HRS)	HAZARDOUS	······································	
ETR (3) WTR (3)	MAX	MIN	YES NO)	
AREA LOCATION OLF KO OPF TPF SPF	AREA LOCATION PERSONNEL (HEADCOUNT) TOTAL MANPOWER OPF		GROUND SUPPORT EQUI		
PCR 🗆		+ TECH			
ORB (SAFETY ENGIN	ECH			
		PPORT			
			}	NEW	
TUG INTERFACE: ORBITER F	ACILITY	TUG ORIENTATION: HURIZONTAL		s	
SPACECRAFT D S		VERTICAL []	MANHOUR	5	
SOFTWARE PEQUIRES LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER OPERATIONS: Not Groun	MP 🗇	Function			
			-		
REMARKS:				 	
COMMODITIES/CONSU	JMABLES REQU	IRED:			

FUNCTION NO:	FUNCTION TITLE:	:		
Ref 11	Connect S/C Carry Near GSE			
FUNCTION OBJECTIV	E:			
Connect S/C	GSE as required to support sys	stems verification.		
	r			
SITE LOCATION ETR 23	TIME TO COMPLETE (HRS)	HAZARDOUS		
WTR 🔀	MAX _5 MIN2	YES* NO		
AREA LOCATION	PERSONNEL (HEADCOUNT) TOTAL MANPOWER	GROUND SUPPORT EQUIPMENT		
OLF []	TEST CONDUCTOR	LPS OTHER (SPECIFY)		
TPF 🖸	TEST ENGINEERSPROPULSION TECH			
SPF ED PCR ED	MECH/STRU/TH TECH			
ORB 🗆	SAFETY ENGINEER			
	QUAL CONT. TECH TECHNICAL SUPPORT			
		PROCEDURES N/A NEW CHANGE		
TUG INTERFACE:	TUG ORIENTATION: FACILITY HORIZONTAL A	PAGES		
SPACECRAFT D S		MANHOURS		
	MP	d to support Tug/kick stage		
REMARKS: Monitor fun and S/C pro	ction only for Tug ground oper	ations. Hazardous due to ordnance		
COMMODITIES/CONSU	IMARLES REOLURED			
COMMODITIES/CONSU	NIMABES RECOINED.			

FUNCTION NO: Ref 12	FUNCTION TITLE:	Mate Shuttl Servicing F	e to Pad, Shuttle reps.	
FUNCTION OBJECTIVE				· · · · · · · · · · · · · · · · · · ·
Install shu	ttle on pad			
SITE LOCATION	TIME TO COMPLETE (H	RS)	HAZARDOUS	
ETR SE WTR SE	MAX MIN		YES NO	
AREA LOCATION OLF OPF TPF SPF	PERSONNEL (HEADCOUTOTAL MANPOWERTEST CONDUCTORTEST ENGINEERSPROPULSION TECHMECH/STRU/TH TECH_		GROUND SUPPORT EQUIPMENT LPS	<u></u>
PCR Di ORB D	AVIONICS TECH SAFETY ENGINEER QUAL CONT. TECH			
	TECHNICAL SUPPORT		PROCEDURES NEW	CHANGE
TUG INTERFACE: ORBITER D I SPACECRAFT D S	ACILITY 🗆 HOR	RIENTATION: IZONTAL TICAL	PAGES	-
SOFTWARE REQUIRE LPS ORB ON BOARD CO TUG ON BOARD CO GROUND CONTROL OTHER	DMP 🗆			
OPERATIONS:				* ***
Non-Tug fun	ction			
REMARKS:				
COMMODITIES/CONSI	UMABLES REQUIRED:			

FUNCTION NO:	FUNCTION T	ITLE:			
Ref 13	Launch R	Launch Readiness Verification			
FUNCTION OBJECTIVE Verify Shuttl		servicing and pre	e-launch operations.		
SITE LOCATION	TIME TO COMPI	LETE (HRS)	HAZARDOUS		
ETR &D WTR.	MAX	MIN 3.0	YES NO		
AREA LOCATION OLF OPF TPF	PERSONNEL (HEADCOUNT) TOTAL MANPOWER TEST CONDUCTOR TEST ENGINEERS PROPULSION TECH				
PCR 🖺	AVIONICS TEC	TECH			
·	QUAL CONT. TO	ECH			
		PPORT	PROCEDURES NEW	CHANCE	
TUG INTERFACE: ORBITER □ FA SPACECRAFT □ SC	ACILITY [] DFTWARE []	TUG ORIENTATION: HORIZONTAL [] VERTICAL []	PROCEDURES NEW PAGES MANHOURS		
LPS ORB ON-BOARD CON TUG ON-BOARD CON GROUND CONTROL OTHER OPERATIONS: Non-Tug funct	MP				
REMARKS:					
COMMODITIES/CONSUM	MABLES REQUI	RED:			

FUNCTION NO:	FUNCTION T	ITLE:			
Ref 14	Purge a	nd Sample Facility	LO ₂ and LH ₂ System		
FUNCTION OBJECTIVE	:				
Verify clean	liness of s	ystems			
í	TIME TO COMP		HAZARDOUS		
ETR 😡 WTR 🗀	MAX	MIN_2.0	YES NO	Third had	
OLF [] OPF [] TPF []	PERSONNEL (HEADCOUNT) TOTAL MANPOWER TEST CONDUCTOR TEST ENGINEERS PROPULSION TECH		GROUND SUPPORT EQUIPORT EQUIPORT (SI		
PCR 🗆		H TECH			
ORB L	SAFETY ENGIN	ECH			<u>-</u>
		PPORT			
TUG INTERFACE:		TUG ORIENTATION:	PROCEDURES	NEW	
	ACILITY D	HORIZONTAL	i	·	
SOFTWARE REQUIREN					
LPS ORB ON-BOARD CON TUG ON-BOARD CON GROUND CONTROL OTHER	VIP 🗀				
OPERATIONS:					
Non-Tug fur	ction				
REMARKS:			4		
	•				
COMMODITIES/CONSU	MABLES REQU	IRED:			

FUNCTION NO:	FUNCTION TI	TLE:	1		
Ref 15	Final S	Final S/C Service and Flight Preps.			
FUNCTION OBJECTIVE	:				
Prep. S/C fo	or Flight				
SITE LOCATION	TIME TO COMPI	LETE (HRS)	HAZARDOUS		
ETR 🖾 WTR 🖂	MAX	MIN	YES NO		
OLF OPF	PERSONNEL (HEADCOUNT) TOTAL MANPOWER TEST CONDUCTOR TEST ENGINEERS PROPULSION TECH				
SPF U	MECH/STRU/TH	† TECH	.]		
		1 EER			
	QUAL CONT. TE	ECH			
	TECHNICAL SU	PPORT	DDOGEDUDES NEW CHANG	——	
TUG INTERFACE:		TUG ORIENTATION:	PROCEDURES NEW CHANG		
ORBITER - F	ACILITY [HORIZONTAL 🖂	MANHOURS	_	
SPACECRAFT SI		VERTICAL 図			
LPS ORB ON-BOARD COM TUG ON-BOARD COM GROWIND CONTROL OTHER	MP 🗆				
OPERATIONS: Final S/C se	ervicing, if	required, for RTG	G's, biological payloads, etc.		
				ļ	
_					
DELLADICO					
REMARKS:					
Non-Tug func	tion				
COMMODITIES/CONSU	MABLES REQUI	RED:			

FUNCTION NO:	FUNCTION T	TLE:		
Ref 16	Cabin C	loseout		
FUNCTION OBJECTIV	E:			
Final Orbit	er Cabin Set	-Up and Prep. for	Launch	
SITE LOCATION	TIME TO COMP	LETE (HRS)	HAZARDOUS	
ETR 52 WTR 53	MAX	MIN_ 1.5	YESNO	_
AREA LOCATION OLF OPF TPF SPF PCR ORB ORB	TEST CONDUCTEST ENGINEE PROPULSION T MECH/STRU/TH AVIONICS TECH SAFETY ENGIN	WERTORRSHTECHH		
		ECH PPORT		
TUG INTERFACE: ORBITER SPACECRAFT		TUG ORIENTATION: HORIZONTAL VERTICAL	PROCEDURES NEW C PAGES	
SOFTWARE REQUIRE LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTRO OTHER OPERATIONS: Non-Tug Fun	OMP ODMP ODMP ODMP ODMP			
REMARKS:	UMABLES REQU	IRED:		

FUNCTION NO:	FUNCTION T	TLE:			
Ref 17	Clear Pa	Clear Pad and Shuttle Service			
FUNCTION OBJECTIVE	= :				
		ial personnel and and service orbite	service ECLSS, condition ET, r fuel cells.		
SITE LOCATION	TIME TO COMPI		HAZARDOUS		
ETR 28 WTR ED	MAX		YES NO		
AREA LOCATION OLF OPF TPF SPF O	TEST CONDUCT TEST ENGINEE PROPULSION T	WER FOR RS ECH	GROUND SUPPORT EQUIPMENT LPS () OTHER () (SPECIFY)		
PCR 🗆		1 TECH			
ORE &	SAFETY ENGIN	EER			
		PPORT			
TUG INTERFACE:		TUG ORIENTATION:	PROCEDURES NEW PAGES		
	ACILITY	HORIZONTAL []	MANHOURS		
SOFTWARE REQUIRES LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER OPERATIONS: Non-Tug fun	MP				
REMARKS:					
COMMODITIES/CONSU	JMABLES REQUI	RED:			

一是不知,我们还是一个的意思,也是是不知识的是是相信的,也是不知识的,也是不是一个的,也是不是一个的,也是不是一个的,也是一个的,也是一个的,也是一个的,也是是 第二十二章 "我们是一个的意思,我们就是一个是是一个的意思,也是不知识的,我们就是一个的,我们就是一个的,我们就是一个的,我们就是一个的,我们就是一个的,我们就

FUNCTION NO:	FUNCTION T	TLE:		
Ref 18	Orbiter	Hypergolic Servici	ng	
FUNCTION OBJECTIV				
Load orbiter	hypergolic			
SITE LOCATION	ТІМЕ ТО СОМРІ	_ETE (HRS)	HAZARDOUS	
ETR 🖾 WTR 🔂	MAX	MIN 6.0	YES	
AREA LOCATION	PERSONNEL (H		GROUND SUPPORT EQUIPMENT	
OLF []	TEST CONDUCT	WER	LPS OTHER (SPECIFY)	
OPF TPF	TEST ENGINEE	RS		
SPF 🗀	MECH/STRU/TH	ECH		
PCR D		1	,	
	QUAL CONT. TE	ECH		
	TECHNICAL SU	PPORT		
TUG INTERFACE:	ļ	TUG ORIENTATION:	PROCEDURES NEW	
ORBITER		HORIZONTAL 🗆	PAGES	
SPACECRAFT D S		VERTICAL	MANHOURS	
SOFTWARE REQUIRE LPS ORB ON-BOARD CO TUG ON-BOARD CO GROUND CONTROL OTHER	OMP 🗆			
OPERATIONS:			· · · · · · · · · · · · · · · · · · ·	
Non-Tug Func	tion			
		•		
REMARKS:				
TIE WY WITTE				
	,			
COMMODITIES/CONSU	IMARI ES REOLU	RED:		
1005511123/00.1430	(1E40)			

FUNCTION NO:	FUNCTION TI	TLE:	:		
Ref 19	Open Pad	Open Pad and Servicing Disconnect.			
FUNCTION OBJECTIVE	:				
Disconnect S	huttle Servi	icing Lines			
SITE LOCATION	TIME TO COMPL	ETE (HRS)	HAZARDOUS		
ETR 52 WTR 52	MAX	MIN_1.5	YES. X NO		
AREA LOCATION OLF OPF TPF SPF O	PERSONNEL (HEADCOUNT) TOTAL MANPOWER TEST CONDUCTOR TEST ENGINEERS PROPULSION TECH MECH/STRU/TH TECH		GROUND SUPPORT EQUIPMENT LPS OTHER (SPECIFY)		
ORB 03	SAFETY ENGIN	EER			
		PPORT			
		THE CRIENTATION	PROCEDURES NEW		
TUG INTERFACE: ORBITER SF SPACECRAFT SI	ACILITY []	TUG ORIENTATION: HORIZONTAL [] VERTICAL &	PAGES2 MANHOURS12		
	MP	upply from Orbiter	Interface.		
REMARKS:					
COMMODITIES/CONSU	MABLES REQUI	RED:			

FUNCTION NO:	FUNCTION T	TLE: Close Orbiter	Bay Doors, Retract PCR	
Ref 20		and Clear Pac		
FUNCTION OBJECTIVE	E:			
Final Preps	for Shuttle	Launch		
				··
SITE LOCATION ETR D	TIME TO COMPL		HAZARDOUS	
WTR 🗆	MAX	MIN. 1.5	YES, NO	
AREA LOCATION	PERSONNEL (H	EADCOUNT) WER	GROUND SUPPORT EQUIPMENT	
OLF []	TEST CONDUCT	TOR	LPS OTHER (SPECIFY)	
OPF 🗆		RS		
SPF 🗆	MECH/STRU/TH	TECH		
PCR CO	AVIONICS TECH			
	QUAL CONT. TE	ECH		<u> </u>
	TECHNICAL SU	PPORT		
TUG INTERFACE:		TUG ORIENTATION:	PROCEDURES NEW	
ORBITER DF	ACILITY 🗆	HORIZONTAL []	PAGES MANHOURS	
SPACECRAFT S		VERTICAL	WANAOON3	
SOFTWARE REQUIRED				
ORB ON-BOARD CO				
GROUND CONTROL OTHER	STATION 🗍		•	
OPERATIONS:				
Non-Tug Fund	tion			
				
REMARKS:	· · · · · · · · · · · · · · · · · · ·			
newanks.				
COMMODITIES/CONSU	MABLES REQUI	RED:		
		W-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1		

TUG GSE REQUIREMENTS SPECIFICATION DATA SHEET

A Tug GSE Requirements Specification Sheet is prepared for each item of GSE required to perform the ground checkout function. These sheets, catalogued by GSE unit number, provide the following summary information:

Name:

The GSE article name

Item No.:

An alpha-numeric identification system of identifying and cataloguing the GSE in four categories:

1. A-XXX Avionics GSE

2. H-XXX Handling Access and Transportation GSE

P-XXX Propulsion and Mechanical GSE

4. S-XXX Structural GSE

Requirement Summary:

Summary and identification of specific support requirements requiring this GSE item.

Item

Description:

A narrative description of the GSE item and its function in support of the Tug Functional Flow Diagram.

からのなるとは過じてきにもできた。このでは、大変ないでは、大変ないないのではないでは、「動物ではないでは、一般では、大変ないないでは、「ないないでは、ないないでは、「ないないでは、「ないないないでは、

Dimensions:

Physical size of the unit.

Power:

Power and power characteristics required from facility interface to support GSE unit.

Weight (1bs):

Physical weight of unit.

Fluid

Requirements:

Type (H_e, N_2, H_20) and amount (pressure, flow rate) of fluids (liquid and gas) from facility interface required to support unit operation.

Article or

Assembly Supported: Identification of articles, Tug, kick stage, adapter, etc., that a workstand or test fixture must be able to support.

^{*}Defined in the Tug Function Description Data Sheets in Appendix A.

Vehicle

Interface: Description of physical interface between flight

article and GSE unit.

Facility

Interface: Description of physical interface between GSE and

the facility where it is located.

Other

Interfacing GSE: Identification of GSE units that interface with

this particular GSE item.

Mobility Mobility

Requirements: Identification of any mobility/portability require-

ments for particular unit.

Operational Mode: Identification of the normal modes of operation of

unit, i.e., local, remote or both, with any clarifying

comments.

Software

Requirements: Definition of GSE software requirements (programs)

necessary for GSE unit to accomplish its operational

function.

Equipment Source: Identifies possible source of GSE item, i.e., new,

existing, modified, commercial, with clarifying

remarks.

Equipment

Allocation: Provide a cross reference of GSE utilization to

functional flow block number of GSE item number.

Additionally, the number of units required to support

Tug activity at each launch site is identified.

*Reference: subplan A, Volume II, Part I.

NAME Electrical Power Supply	ITEM NO	\-001	
REQUIREMENT SUMMARY Provide voltage			
and secondary power systems during te	st and/or repair operations.		
ITEM DESCRIPTION The Tug Electrical Po	wer Supply will provide the proper	:	
voltage regulation, circuit isolation	, and overload protection for the	Tug	
flight hardware.			
			<u>.</u>
DIMENSIONS (FT) L W H	POWER $110/220$ V 60 Hz 1 $ heta$		KW
WEIGHT (LBS)FLUID REQUIREN	MENTS N/A PSIG QU	AN	
ARTICLE OR ASSEMBLY SUPPORTED Tug Fli			
VEHICLE INTERFACE			
FACILITY INTERFACE 110/220 Vac Commerc			
OTHER INTERFACING GSE		······································	
MOBILITY REQUIREMENTS			
OPERATIONAL MODE: LOCAL X BEMOT	BOTHBETAILS	'	
SOFTWARE DEQUIREMENTS N/A	***************************************		
SOFTWAREGOTREMENTS			··
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		·
NEW EXISTING	FUNCTION BLOCK NO.	QUAN	ITITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS	1.2, 1.6, 2.11, 4.16, 4.17,		
	4.19, 4.25, 4.26, 4.28, 4.39,		
	4.43, 4.44, 4.46, 4.7, 5.1, 5.2,		
	5.4, 5.5, 5.6, 5.7, 5.21		
			
		 	<u> </u>
	TOTAL REQUIRED	2	3

· 等的 · 与文章 "多少的"。 學是" · 以有了中有是是一个大孩子,我就是一个最多,是是有人便是一个最后的

NAME Electrical Power Test Set	ITEM NO	A-002	
REQUIREMENT SUMMARY Provide power s			
current switching, and overload prot	ection.		
ITEM DESCRIPTION The Tug electrical	power test set provides external s	timuli	
measurement, and recording capabilit	ies to test components and subasse	mblies	
of the Tug electrical power system t	to isolate out of spec power tolera	nces.	
			···
C!MENSIONS (FT) L W	H DOWED 110 V 60 Hz 1 A		Κ\M
WEIGHT (LBS)FLUID REQUIRE			
WEIGHT (EBS)T EOID REGUINE	1310	· · · · · · · · · · · · · · · · · · ·	
ARTICLE OR ASSEMBLY SUPPORTED			
VEHICLE INTERFACE			
FACILITY INTERFACE			·
OTHER INTERFACING GSF External reco	ording or monitoring equipment.		
MOBILITY REQUIREMENTS			
OPERATIONAL MODE: LOCAL x REMO	OTEBOTHDETAILS	S	·
SOFTWARE REQUIREMENTS			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		
NEW □ EXISTING □	FUNCTION BLOCK NO.	QUAN	ITITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS	2.11, 4.17, 4.39	1	2
	2.22, 40.27, 40.27		
	·		
	TOTAL REQUIRED		2

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NAME Electrical Load Banks	ITEM NO	A-003	
REQUIREMENT SUMMARY Simulate Tug elec	ctrical loads during power distrib		
	· · · · · · · · · · · · · · · · · · ·		
ITEM DESCRIPTION The Tug electrical l			1
impedance used, in conjunction with the	ne electrical power test set, to s	imula	te
electrical loads during power distrib	ution tests.		
^			
		==	
DIMENSIONS (FT) L W H	POWER N/A V Hz θ		KW
WEIGHT (LBS)FLUID REQUIREM			
WEIGHT (200)			
ARTICLE OR ASSEMBLY SUPPORTED			
VEHICLE INTERFACE			
FACILITY INTERFACE			
OTHER INTERFACING GSE Electrical	Power Test Set.		
MOBILITY REQUIREMENTS			
OPERATIONAL MODE: LOCAL X REMOT	EBOTHDETAILS		
SOFTWARE REQUIREMENTSN/A	· · · · · · · · · · · · · · · · · · ·		
		· . · · · · · · · · · · · · · · · · · ·	
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		
NEW [] EXISTING [2X	FUNCTION BLOCK NO.	QUAN	
MODIFIED COMMERCIAL		WTR	ETR
REMARKS	2.11, 4.17, 4.19, 4.39		2
		:	
		:	
	TOTAL F LUIRED		2

NASS C1011 8-74 (PRELIMINARY)

Battany Tast Sat	iTEM NO	\ - 004	
NAME Battery Test Set			
REQUIREMENT SUMMARY Provide the capabi			
battery electrolyte and to determine t		Sad and	
no-load conditions.			
ITEM DESCRIPTION The Tug Battery Test			
checkout battery activation, cell/bat			
static or charging conditions. The Tu		er power	<u>.</u>
measure, heater current, and battery	temperature. Cable set included.		
			-
	, , , , , , , , , , , , , , , , , , , 		
			:
DIMENSIONS (FT) L W H	POMER 110/220V 60 Hz 1 0		KW
WEIGHT (LBS)FLUID REQUIREM	ENTS N/A PSIG QU	JAN	
ARTICLE OR ASSEMBLY SUPPORTED Tug	Batteries		
VEHICLE INTERFACE			
FACILITY INTERFACE			
OTHER INTERFACING GSE			
MOBILITY REQUIREMENTS			
OPERATIONAL MODE: LOCAL X. SEMOT	EBOTHDETAILS	s	
			_
SOFTWARE REQUIREMENTS			
EQUIPMENT SOURCE:	EQUIPT ENT ALLOCATION:		
NEW - EXISTING -	FUNCTION BLOCK NO.	QUANT	ITY
MODIFIED COMMERCIAL		WTR E	TR
REMARKS			
		1	
		 	
		 	
		 	
			
	TOTAL REQUIRED		2

NAMEBattery Charger	ITEM NO	\ -005	
REQUIREMENT SUMMARY The battery char			:S
after each cycle.			
ITEM DESCRIPTION The battery charger s	hall provide the capability to cha	arge a	
(TBD) load at (TBD) volts at a consta			
and then provide a trickle charge to			
included with battery charger.			
DIMENSIONS (FT) L W H	POWER 110/220/ 60 Hz 1 0		ΚW
WEIGHT (LBS)FLUID REQUIREM			
WEIGHT (EBB)			
ARTICLE OR ASSEMBLY SUPPORTED Tug Batte	ries in or out of Tug		
VEHICLE INTERFACE Orbiter Interface			
FACILITY INTERFACE 110/220 Vac commer			
OTHER INTERFACING GSE			
OTHER INTERNACING COL		*	
MOBILITY REQUIREMENTS			
OPERATIONAL MODE: LOCAL X REMOT			
OPERATIONAL MODE: LOCAL NEMO:	50111		
SOFTWARE REQUIREMENTS		*	<u>-</u>
SOFTWARE REGUIREMENTS			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		
NEW EXISTING	FUNCTION BLOCK NO.	QUAN	ITITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS	5.7		
			
		 -	<u> </u>
			
<u>'</u>		 	
		ļ	ļ
	TOTAL REQUIRED	lı	1

NAME Communications Test & Ch	neckout Equipmen	t	ITEM NO	A-006	
REQUIREMENT SUMMARY Verify th					
system and its capability to	receive, transm	it, and respond	l to externa	al stir	nuli
on command.					
ITEM DESCRIPTION (TBD)					
					<u> </u>
	·				
		·			
					1,00
DIMENSIONS (FT)LW	<u>H</u> POWI	ERV	_Hz(θ	ĸw
WEIGHT (LBS)FLUID	REQUIREMENTS	PS	IG0	UAN	
ARTICLE OR ASSEMBLY SUPPORTED					
VEHICLE INTERFACE				•	
FACILITY INTERFACE					
OTHER INTERFACING GSE					
MOBILITY REQUIREMENTS					
OPERATIONAL MODE: LOCAL					
SOFTWARE REQUIREMENTS	- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1				
EQUIPMENT SOURCE:		ENT ALLOCATION:		T	
NEW EXISTING MODIFIED COMMERCIAL COMMERCIAL	FUNCTI	ON BLOCK NO.			ATITY
MODIFIED COMMERCIAL REMARKS				WTR	ETR 1
nemana	2.11,	4.44			
		TO THE PARTY OF TH			
				+-	-
				1	
				 	
				<u> </u>	
	TOTAL	REQUIRED		 	1

NAME Guidance & Navigation Test & Checkout Equipment ITEM NO. A-007	
REQUIREMENT SUMMARY Erect and align IMUs, relate enter angles and drifts of	
the redundant units; perform on-pad short term navigation; validate navigation	
software and perform sequencing run.	
ITEM DESCRIPTION Part of LPS system or other automatic ground computer controlle	d
system communicating and controlling A/B navigation and computer system.	
	-
DIMENSIONS (FT) L W H POWER V Hz $oldsymbol{ heta}$ K	CW
WEIGHT (LBS)FLUID REQUIREMENTSPSIGQUAN	
ARTICLE OF ASSEMBLY SUPPORTED	
VEHICLE INTERFACE	
FACILITY INTERFACE	
OTHER INTERFACING GSE	
MOBILITY REQUIREMENTS	
OPERATIONAL MODE: LOCAL REMOTE BOTH DETAILS	
SOFTWARE REQUIREMENTS	
EQUIPMENT SOURCE: EQUIPMENT ALLOCATION:	
NEW EXISTING FUNCTION BLOCK NO. QUANTIT	Υ
MODIFIED ☐ COMMERCIAL ☐ WTR ET	R
REMARKS 2.11, 4.43 1	
·	
TOTAL REQUIRED 1	

NAME Control and Data Acquisition Cor	nsoleITEM NO.	A-008	
REQUIREMENT SUMMARY This console is			
displays will present real-time data	and provide for call-back of price	or resu	lts.
The controls shall be able to activat	te. sequence, and terminate the to	esting	as
necessary. The control encompasses t	the system under test and is the	origin	of
the pre-programmed test sequences. T	The interface shall be with the la	gunch	
processing system. The console will	l include a count clock system to	provi.d	le
count time and real time. Displays w	vill include digital and video pro	esentat	ions.
Switching and other controls shall pr			
sequencing, and termination of the te			
the necessary communications between	the LPS and the test area under o	control	
DIMENSIONS (FT) 3 L 3 W 5 H	POWER 120 V 60 Hz 1	9	KW
WEIGHT (LBS) 600 FLUID REQUIREM			
	444	<u> </u>	1-4-
ARTICLE OR ASSEMBLY SUPPORTED Tug sys	stems		
VEHICLE INTERFACE		·	
FACILITY INTERFACE			
OTHER INTERFACING GSE		·	
		· · · · · · · · · · · · · · · · · · ·	
MOBILITY REQUIREMENTS None		··· ·· ·· · · · · · · · · · · · · · ·	
OPERATIONAL MODE: LOCALX REMO	TEBOTHDETAIL	.S	
SOFTWARE REQUIREMENTS			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		
NEW G EXISTING []	FUNCTION BLOCK NO.	QUAN	ITITY
MODIFIED COMMERCIAL	1	WTR	ETR
REMARKS	1.6. 2.11. 4.19. 4.21. 4.26.		
	4.27, 4.28, 4.40, 4.42, 4.43,		
	4.44, 4.46, 4.47, 5.2, 5.4		
		1	1
	TOTAL REQUIRED	1	1

NAME Memory Load & Verify Unit		4-009	
REQUIREMENT SUMMARY This unit will b			
to load and verify the Tug Flight Pro			
memory loads. It should have the cap			
punched tape. A buffering unit shoul	d be included to provide the neces	ssary	
isolation and buffering for interface		-	
	-		
	_	·	
DIMENSIONS (FT) L W H			
WEIGHT (LBS)FLUID REQUIREM	ENTS N/A PSIG QU	AN	
			····
ARTICLE OR ASSEMBLY SUPPORTED			
VEHICLE INTERFACE			
FACILITY INTERFACE	i		
OTHER INTERFACING GSE			
MOBILITY REQUIREMENTS			
OPERATIONAL MODE: LOCAL REMOT		S	
SOFTWARE REQUIREMENTS			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:	T	
NEW EXISTING	FUNCTION BLOCK NO.	QUAN	TITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS	2.11, 4.20, 4.27, 4.43, 5.2	1_1_	2
		ļ	
			
	TOTAL REQUIRED	1	2

NAME Electronics Calibration Equipmen	nt	ITEM NO	A-010)
REQUIREMENT SUMMARY The electronics				
the communications and guidance and	navigation electronics	following n	nainter	ance
and during checkout.				
ITEM DESCRIPTION				
	100		7.7	
DIMENSIONS (FT) L W	H POWERV	_Hz()	KW
WEIGHT (LBS)FLUID REQUIRE	EMENTSP	SIG0	UAN	
ARTICLE OR ASSEMBLY SUPPORTED				
VEHICLE INTERFACE				
FACILITY INTERFACE		· 	· · · · · · · · · · · · · · · · · · ·	
OTHER INTERFACING GSE				
MOBILITY REQUIREMENTS			····································	- 1
OPERATIONAL MODE: LOCAL REMO	OTEBOTH	DETAIL	S	
SOFTWARE REQUIREMENTS				
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION			
NEW □ EXISTING □	FUNCTION BLOCK NO.		QUAN	ITITY
MODIFIED COMMERCIAL			WTR	ETR
REMARKS	2.11, 4.21		† · · · · ·	1
F				
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	700		1	
	and the state of t			
			1	
			 	
	TOTAL REQUIRED		<u></u>	1

NAME_ Orbiter Cable Simulator		-011	
REQUIREMENT SUMMARY Simulate Orbiter			
MSS/PSS Payload console,			
ITEM DESCRIPTION The simulator contain	ns cables and connectors necessary	, to	
connect the Payload Console to the Tu	g systems while simulating the imp	edanc	€
characteristics of the Orbiter cable.			
		·	
DIMENSIONS (FT) L W H			
WEIGHT (LBS)FLUID REQUIREM	ENTS <u>N/A</u> PSIG QU	AN	
ARTICLE OR ASSEMBLY SUPPORTED Payload (
VEHICLE INTERFACE Tug/Orbiter elect			
FACILITY INTERFACE N/A			
OTHER INTERFACING GSE None			
2.1.			
MOBILITY REQUIREMENTS N/A			
OPERATIONAL MODE: LOCAL X REMOT	EBOTHDETAILS		
SOFTWARE REQUIREMENTS N/A		-	
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION.		
NEW [] EXISTING []	FUNCTION BLOCK NO.	QUAN	ITITY
MODIFIED COMMERCIAL	, remarkan beadin no.	WTR	ETR
REMARKS			2
TEMPATRO	5.4	<u></u>	
			ļ <u>.</u>
	TOTAL REQUIRED	1	2

NAME <u>Umbilical Simulator</u>		ITEM NO	A-013	2
REQUIREMENT SUMMARY Physical and				
umbilicals.				
ITEM DESCRIPTION The simulator cons	ists of the Orbiter flig	tht type carr	ier,	7 /
electrical connectors and fluid li	ne disconnects.			
DIMENSIONS (FT) L W	H POWER N/A V	Ηzθ		KW
WEIGHT (LBS)FLUID REQUII	REMENTS GN ₂ P	sıg qı	JAN	
			···	
ARTICLE OR ASSEMBLY SUPPORTED Tug				
VEHICLE INTERFACE <u>Tug/Orbiter um</u>	bilical I/F			
FACILITY INTERFACE N/A				
OTHER INTERFACING GSE Pressurization	Control Set			
MOBILITY REQUIREMENTS Mobile				
OPERATIONAL MODE: LOCAL X RE	MOTE	DETAILS	5	
				
SOFTWARE REQUIREMENTSN/A		بدي ويستعد في المستعدد المستعد		
EQUIPMENT SOURCE:	FOUNDMENT ALLOCATION			
N. I Park Labor	EQUIPMENT ALLOCATION	:	Τ	
LAND CANADA	FUNCTION BLOCK NO.			VTITY
REMARKS COMMERCIAL		· · · · · · · · · · · · · · · · · · ·	WTR	ETR
Tremains.	5.4		1_1_	2
			 	
			 	
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			_	<u> </u>
			 	ļ
	TOTAL REQUIRED		1	2

NAME Star Sensor Stimulator	ETEM NO	-013	
REQUIREMENT SUMMARY Functional check			
		() (100 1	
ITEM DESCRIPTION Portable unit that mou	nts directly on the Tug star track	er.	
It will provide a simulated star patt	ern.		
	A		
DIMENSIONS (FT) L W H			
WEIGHT (LBS)FLUID REQUIREM	ENTS N/A PSIG QU	AN	
ARTICLE OR ASSEMBLY SUPPORTED Tug Sta	r Tracker		
VEHICLE INTERFACE Star Tracker	L ALMOREL	 -	
FACILITY INTERFACE N/A			
OTHER INTERFACING GSE LPS			
OTHER HITEM ASSIGNMENT			
MOBILITY REQUIREMENTS Portable			
OPERATIONAL MODE: LOCAL X REMOT			
-			
SOFTWARE REQUIREMENTS LPS Star Trac	ker C/O Program		
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		
NEW EXISTING	FUNCTION BLOCK NO.	QUAN	TITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS	4.21, 4.40, 4.43		1
			· · · · · · · · · · · · · · · · · · ·
	TOTAL REQUIRED		1

NAME Tug/Spacecraft Simulator		-014	
REQUIREMENT SUMMARY Checkout Deploys.			
release under load).			
	W/4		
ITEM DESCRIPTION The Tug/Spacecraft S		e	
conditions necessary to verify Tug ca	pture and release under simulated	load	
conditions.		-h	
		·	
DIMENSIONS (FT) L W H			
WEIGHT (LBS)FLUID REQUIREM	ENTS N/A PSIG QU	AN	
ARTICLE OR ASSEMBLY SUPPORTED Deploym	ent Adapter		
VEHICLE INTERFACE Deployment Adapter/			
FACILITY INTERFACE N/A			
OTHER INTERFACING GSE			
MOBILITY REQUIREMENTS			
OPERATIONAL MODE: LOCAL X REMOT			
SOFTWARE REQUIREMENTS			
	<u> </u>		
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		
NEW 🕄 EXISTING 🗆	FUNCTION BLOCK NO.	QUAN	
MODIFIED COMMERCIAL [WTR	ETR
REMARKS	2.16, 2.17		2_
	TOTAL REQUIRED		2

NAME Fuel Cell Dummy Load Unit		ITEM NO.	A-015	5
REQUIREMENT SUMMARY Provide variable	resistance loads.	Load control	logic,	
current and voltage sensors, for fu				
ITEM DESCRIPTION Connects to the Tug fu	el cell and simula	tes Tug electri	cal	
loads during fuel cell functional	testing.			
				1
	· · · · · · · · · · · · · · · · · · ·			
DIMENSIONS (FT) 2 L 2 W 1.5 H	POWER_120V_	60 Hz 1 (9	KW
WEIGHT (LBS) 200 FLUID REQUIREN	MENTS N/A	PSIGQ	UAN	
				
ARTICLE OR ASSEMBLY SUPPORTED Tug I	Fuel Cell	·		
VEHICLE INTERFACE				
FACILITY INTERFACE				. -
OTHER INTERFACING GSE LPS interfaces	for control and da	ta transfer du	ring	
functional tests of the fuel cell.			- , , , re	
MOBILITY REQUIREMENTS None				_
OPERATIONAL MODE: LOCALREMO	TEBOTH	x DETAIL	.s	
SOFTWARE REQUIREMENTSN/A			·	
EQUIPMENT SOURCE:	EQUIPMENT ALLOCAT		<u> </u>	
NEW EXISTING	FUNCTION BLOCK NO.		on ===	ITITY
MODIFIED COMMERCIAL			WTR	ETR
REMARKS		7.50		
Used for fuel cell maintenance and				
refurbishment			ļ	
			ļ	<u> </u>
			<u> </u>	
	TOTAL REQUIRED			2

NAME_ Ordnance Event Verification	Cables		ITEM NO	A-016	
REQUIREMENT SUMMARY To provide					
when ordnance items are installed					
ITEM DESCRIPTION Wiring harness to			run-arounds	of ordna	nce
devices. The cables will have the		·			
occurrence without stopping the		-			
		-		•	
DIMENSIONS (FT)LW	<u> </u>	ER <u>120</u> V_	60 Hz <u>1</u>	_θ	KW
WEIGHT (LBS)FLUID REQ					
ARTICLE OR ASSEMBLY SUPPORTED Tug/	Kick Stage ()rdnance			
VEHICLE INTERFACE					
FACILITY INTERFACE					
OTHER INTERFACING GSE					
MOBILITY REQUIREMENTS					
OPERATIONAL MODE: LOCAL	REMOTE	ВОТН	xDETA	VILS	
SOFTWARE REQUIREMENTS					
FOLUBRIANT SOURCE		ICALT ALL TO	:IC/b!		
EQUIPMENT SOURCE:		IENT ALLOCAT			
NEW EXISTING EXISTING EXISTENCE EXIST		ON BLOCK NO		QUAN	ſ
MODIFIED COMMERCIAL	•			WTR	ETR
REMARKS	4.26,	4.28		11	_1_
					<u> </u>
				_	
			<u> </u>		
	TOTAL	REQUIRED		1	$\prod_{i=1}^{n}$

NAME Latch Mechanism Test Set	ITEM NO	A-017	1
REQUIREMENT SUMMARY To provide the c			
mating pin pullers and Tug/Adapter se	paration latches.		
			Material de la Canada de La Can
ITEM DESCRIPTION The latch mechanism tes	t set will be used to energize the	e spac	e-
craft interfaces for mate and demate	operations to support simulated To	ıg	
activities. The test set will be use	ed to verify the functional integr	ity of	
the adapter to Tug latching mechanism	1.		
			_
DIMENSIONS (FT) L W H			
WEIGHT (LBS)FLUID REQUIREM	ENTS N/A PSIG QU	AN	
ARTICLE OR ASSEMBLY SUPPORTED Tug space			
VEHICLE INTERFACE			
FACILITY INTERFACE			
OTHER INTERFACING GSE			
	• • • • • • • • • • • • • • • • • • • •		
MOBILITY REQUIREMENTS			
OPERATIONAL MODE: LOCAL x REMOT	TEBOTHDETAILS	·	
SOFTWARE REQUIREMENTS			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		
NEW 123 EXISTING □	FUNCTION BLOCK NO.	OLIAN	ITITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS	. 16	*****	1
	4.16		
			
			
			<u> </u>
		 	<u> </u>
		<u> </u>	
	TOTAL REQUIRED	<u> </u>	1

NAME Hardware Interface Module (HIM)	ITEM NO. A	018	
REQUIREMENT SUMMARY <u>Interfaces</u> the LP			
monitoring capabilities.			
ITEM DESCRIPTION The HIM is a single ra	ck of electronic equipment. It us	ses a	
modular concept to accommodate varyi	ng user requirements by using a g	roup o	£
standard and nonstandard stimulies/m	onitor cards. 30 card slots are	provid	ed.
Typical cards are analog cards (8/ca	rd), discrete indications (16/care	d), an	d
discrete stimuli (8/card). Inputs t	o the HIM are processed and resul	t_in	
commands decoded, transmitted, and p	erformed in the GSE or result in	monito	ring
functions being performed, encoded a			
DIMENSIONS (FT) 2号 L 2 W 6号 H	28 VDC or POWER 120 V 60 Hz $_1$ $_2$)	KW
WEIGHT (LBS)FLUID REQUIREN			
ARTICLE OR ASSEMBLY SUPPORTED GSE			
VEHICLE INTERFACE <u>None (may interface T</u>	-4 umbilical)		
FACILITY INTERFACE <u>Power, signal trans</u>	mission lines		
OTHER INTERFACING GSE HTM distributor,	power amplification and switching	g GSE	
MOBILITY REQUIREMENTS Fixed			
OPERATIONAL MODE: LOCAL REMO	TEBOTHXDETAILS	Prima	ry
Mode is Remote			
SOFTWARE REQUIREMENTSNone			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		
NEW 🖾 EXISTING 🗆	FUNCTION BLOCK NO.	QUAN	TITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS Part of CCMS which is part		16	16
of the LPS. For details, see			
KSC-LPS-RD-026 (8-9-74) Pgs 172 thru			
263.			
			<u> </u>
			<u></u>
	TOTAL REQUIRED	16	16
	, O , AE HEROHIEO	16	16

不是一个人,我们就是一个人的,我们就是一个人的,我们也没有一个人的,我们也没有一个人的,我们也没有一个人的,我们也会会会一个人的,我们也会会会会会会会会会会会会 第一个人的话,我们就是一个人的话,我们就是一个人的话,我们就是一个人的话,我们就是一个人的话,我们就是一个人的话,我们就是一个人的话,我们就是一个人的话,我们也

NAME Tug Workstand	ITEM NO	-0 <u>0</u> 1	
REQUIREMENT SUMMARY Tug Post-Flight safing and damage inspection, cleaning,			
maintenance and refurbishment, checkou	t, and when applicable, spacecraf	t mate	
and payload checkout.			
ITEM DESCRIPTION A multiple level verti		Tug re	-
furbishment and checkout. Hinged/remo	val sections permit access, remove	al, an	ıd
replacement of Adapter Tug Engine Kick	Stage and spacecraft. Platforms	will	
permit access to all areas of the inte	rtank area without restricting cl	earanc	е
through access doors. Workstand will	support the Tug and provide space	for	
installation of checkout GSE.		71-14	
DIMENSIONS (FT) 25 L 70 W 75 H	POWER N/A V Hz $ heta$		KW
WEIGHT (LBS)FLUID REQUIREM	ENTS N/A PSIG QU	AN	
ARTICLE OR ASSEMBLY SUPPORTED Tug, Adap			
VEHICLE INTERFACE			
FACILITY INTERFACE Tug Processing Facili	ty Airlock and Checkout Area		
OTHER INTERFACING GSE <u>Provide</u> space for	· leak test equipment, carry near		
equipment, etc.			
MOBILITY REQUIREMENTS None			
OPERATIONAL MODE: LOCAL REMOT	reBOTHDETAILS	;	
SOFTWARE REQUIREMENTS N/A			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		·
NEW & EXISTING	FUNCTION BLOCK NO.	QUAN	ITITV
	TONE TION BEOCK NO.	WTR	
MODIFIED COMMERCIAL REMARKS See attached figure.		 	ETR
NEWARKS BOT TELEGISTOR TEGETS	1.4, 2.9, 4.3, 4.12, 5.22	1	3
		 	
			<u> </u>
		<u></u>	
	TOTAL REQUIRED	·I	3

NAME Engine Workstand	ITEM NO	H-002	
REQUIREMENT SUMMARY Support the Tug			
engine when removed from the Tug.			
		A CALL THE REAL PROPERTY OF THE PARTY OF THE	or delineran
ITEM DESCRIPTION Provide attach points	and support the Tug engine when	it is	
separated from the Tug. Provide phys	ical access to all areas of the	Tug	
engine and provide support for person	nel, servicing, and checkout equ	ipment.	
			····
			
DIMENSIONS (FT) L W H	DOMED N/A V Uz	Ω	KW
WEIGHT (LBS)FLUID REQUIREM			
WEIGHT (LBS)FLOID REGULATION	F310	IOAN,	
ARTICLE OR ASSEMBLY SUPPORTED Tug En	gine		•
VEHICLE INTERFACE N/A			
FACILITY INTERFACE N/A			
OTHER INTERFACING GSE Carry near engi			
		···	
MOBILITY REQUIREMENTS N/A			
OPERATIONAL MODE: LOCAL REMOT	TEBOTHDETAIL	LS	;
SOFTWARE REQUIREMENTS N/A			
EQUIPMENT SOURCE:	Trouburne Att Control		
	FUNCTION BLOCK NO.	TOUGH	
	FUNCTION BLOCK NO.	WTR	TITY
MODIFIED ☐ COMMERCIAL ☐ REMARKS		WIR	ETR
Used for maintenance and refurbishment		 	-
			
		 	
		 	-
		-	
			
	TOTAL REQUIRES		
	TOTAL REQUIRED		2

NAME Deployment Adapter Workstand	ITEM NO	-003	
REQUIREMENT SUMMARY Provide support for			
Deployment Adapter inspection, mainten		,	
ITEM DESCRIPTION Provide working platfo	orms for inspection, maintenance,	refur	bish,
and checkout of the Deployment Adapter			
accommodate the Deployment Adapter on			
access to all areas of the Adapter.			
DIMENSIONS (FT) 24 L 24 W 10 H	FOWER N/A V Hz 0	,	ĸw
WEIGHT (LBS)FLUID REQUIREM			
ARTICLE OR ASSEMBLY SUPPORTED Personn	el & Equipment		
FACILITY INTERFACE			
OTHER INTERFACING GSE			
MOBILITY REQUIREMENTS N/A			
OPERATIONAL MODE: LOCALREMOT			
SOFTWARE REQUIREMENTS N/A		~- <u></u>	
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		
NEW EXISTING	FUNCTION BLOCK NO.	QUAN	TITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS	2.13, 2.15		2
			<u> </u>
,			
	TOTAL REQUIRED		2
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NAME Tug Transportation Dolly		H-004	
REQUIREMENT SUMMARY Ground Transpor	ctation of Tug, Tug and adapter.		
			··
		4	Allega, Land
TEM DESCRIPTION Wheel mounted chassis		h point	s.
for ground transportation,			
			-
	The state of the s		
DIMENSIONS (FT) 40 L 16 W 11 I	H POWER N/A V Hz		KW
WEIGHT (LBS)FLUID REQUIRE			
ARTICLE OR ASSEMBLY SUPPORTED Tug at	nd Adapter		
VEHICLE INTERFACE Tug to Orbiter atta	ach points on Tug.		
FACILITY INTERFACE			_ .
OTHER INTERFACING GSE			
		······································	
MOBILITY REQUIREMENTS Over-the-road			
OPERATIONAL MODE: LOCALREMO	DIEBOTHDETAI	LS	
SOFTWARE REQUIREMENTS N/A			
301 WAIL REGOMENIENTS			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		
NEW EXISTING	FUNCTION BLOCK NO.	QUAN	VTITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS See attached Figure.	4.3, 4.11, 5.12, 5.13, 5.14,	 	2
	5.16	<u> </u>	ļ
		_	
		-	-
		_	
			-
	TOTAL REQUIRED		2
			

NAME Cargo Bay Work Platform SetITEM NO	н-005	
REQUIREMENT SUMMARY Provide physical access to Tug in Orbiter Cargo		
Two sets required: 1) vertical and 2) horizontal.		
ITEM DESCRIPTION Provide access to and working room around the Tug fo	llowing	
installation and before removal from the Orbiter bay, Platforms wil		
personnel and carry-near GSE and will utilize cargo bay load bearing		
for attach points.		
DIMENSIONS (FT) L W H POWER N/A V Hz	_θ	кw
WEIGHT (LBS) FLUID REQUIREMENTS N/A PSIG	QUAN,	
ARTICLE OR ASSEMBLY SUPPORTED Personnel and carry-over CSE		
VEHICLE INTERFACE N/A		
FACILITY INTERFACE N/A		
OTHER INTERFACING GSE N/A		
	· • • · · · · · · · · · · · · · · · · ·	
MOBILITY REQUIREMENTS N/A		
OPERATIONAL MODE: LOCAL REMOTE BOTH DETA	NLS	
	····	
SOFTWARE REQUIREMENTSN/A		
EQUIPMENT SOURCE: EQUIPMENT ALLOCATION:		
NEW EXISTING FUNCTION BLOCK NO.	QUAN	TICY
MODIFIED COMMERCIAL	WTR	ETR
REMARKS 1.1	1	2
TOTAL REQUIRED	1	2

NAME Internal Platforms	ITEM NO	H-006	
REQUIREMENT SUMMARY Provide physic			
section, portable and attach to Tug	structure and Tug Workstand.		· · · · · · · · · · · · · · · · · · ·
			مورد نداد الدو
ITEM DESCRIPTION Portable platforms th	hat can be placed in the intertank	areas	to
provide access to all areas for insp	pection, refurbishment, and repair.	. The	
platforms allow access without resta	riction, clearance through access o	loors.	
		•	
			-
DIMENSIONS (FT) L W	H POWERN/A V Hz)	KW
WEIGHT (LBS)FLUID REQUIRE			
ARTICLE OR ASSEMBLY SUPPORTED Per	sonnel		
VEHICLE INTERFACE Inte	erface Structure		
FACILITY INTERFACE			
OTHER INTERFACING GSE Tug	Workstands		
×/4			
MOBILITY REQUIREMENTS N/A			
OPERATIONAL MODE: LOCAL REM	DETAIL	.s	
SOFTWASE DECLUSIONES N/A			<u> </u>
SOFTWARE REQUIREMENTS N/A			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:	****	
NEW [] EXISTING []	FUNCTION BLOCK NO.	AND	TITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS	2.7, 2.9		2
			<u> </u>
	TOTAL REQUIRED		2

NAME Deployment Adapter Dolly	ITEM NO	H-007	
REQUIREMENT SUMMARY Ground transportat			
adapter support for Tug-Adapter demate			ty
to rotate adapter.			
ITEM DESCRIPTION Wheel mounted chassis		r at	the
Orbiter attachment fitting, providing			
inspection, maintenance, refurbishment			
capability to rotate the Adapter 180 d			

DIMENSIONS (FT) 16 L 16 W 11 H	POWER N/A V Hz θ		KW
WEIGHT (LBS)FLUID REQUIREME			
ARTICLE OR ASSEMBLY SUPPORTED Deploys	ment Adapter		
VEHICLE INTERFACE Deployment Adapter (Orbiter Attach Fitting		
FACILITY INTERFACE			
OTHER INTERFACING GSE			
MOBILITY REQUIREMENTS Over-the-road cap	pability	··	
OPERATIONAL MODE: LOCALREMOT			
SOFTWARE REQUIREMENTS N/A			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		
NEW EXISTING	FUNCTION BLOCK NO.	QUAN	TITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS See attached figure.	2.6, 2.13, 2.14		_/ 3
,			
	TOTAL REQUIRED		3

NAME <u>Deployment Adapter Protective Co</u>	over Kit ITEM NO	H-008	
REQUIREMENT SUMMARY Sealable cover for			on
from moisture and maintaining cleanl	iness,		
ITEM DESCRIPTION Two layer cover with	inner layer made from impervious ma	ateria	1
with sealable closures. The outer co	over is a heavy fabric covering the	e Adap	ter
and attaching to the Adapter Dolly.	The kit includes a free breathing	desic	cant
assembly with air filters to maintain	n cleanliness,	·	
			<u>-</u>
			12114
DIMENSIONS (FT) L W H			
WEIGHT (LBS)FLUID REQUIREN		AN	
ARTICLE OR ASSEMBLY SUPPORTED		····	
VEHICLE INTERFACE External cover for		, , , , , , , , , , , , , , , , , , , ,	
FACILITY INTERFACE			
1 37/A			
MOBILITY REQUIREMENTS N/A			
OPERATIONAL MODE: LOCALREMO		· · · · · · · · · · · · · · · · · · ·	
SOFTWARE REQUIREMENTS			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:	· · · · · · · · · · · · · · · · · · ·	
NEW [] EXISTING []	FUNCTION BLOCK NO.	QUAN	TITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS			
Used for storage			<u> </u>
	TOTAL REQUIRED		3

NAME Spacecraft Adapter Transport/S	Storage Pallet ITEM	NO. <u>H-009</u>
REQUIREMENT SUMMARY Transportation/		
removed from Tug.		
ITEM DESCRIPTION A rigid pallet with	lifting lugs and protective	cover on which
the Spacecraft adapter is placed for	transportation and storage.	
		
DIMENSIONS (FT) 15 L 15 W 2	H POWER N/A V Hz	θ κw
WEIGHT (LBS)FLUID REQUIRE	MENTS N/A PSIG	QUAN
ARTICLE OR ASSEMBLY SUPPORTED Spaced	craft Adapter	
VEHICLE INTERFACE		
FACILITY INTERFACE	o Vit	
OTHER INTERFACING GSE Handling Sling	g KIL	
MOBILITY REQUIREMENTSREMO		DETAILS
OFERATIONAL MODE.	<u> </u>	
SOFTWARE REQUIREMENTSN/A		
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:	
NEW [] EXISTING []	FUNCTION BLOCK NO.	QUANTITY
MODIFIED COMMERCIAL		WTR ETR
REMARKS	2.7, 4.23	5
	TOTAL REQUIRED	5
<u> </u>		

NAME Kick Stage Protective Cover Kit		H-010	
REQUIREMENT SUMMARY Sealable covers			
tion from moisture and maintaining clo	-		
ITEM DESCRIPTION Two layer cover with in	,,,	teria	1
with sealable closures. The outer co			
and attaching to the supporting fixtu			
desiccant assembly with air filters t			
environment during shipment or storage			
	= =		
		_	
DIMENSIONS (FT) L W H	POWER N/A V Hz $ heta$		KW
WEIGHT (LBS)FLUID REQUIREM			
WEIGHT (EBO)			
ARTICLE OR ASSEMBLY SUPPORTED Kick Sta	ge and SRM		
VEHICLE INTERFACE External covers for			
FACILITY INTERFACE			
OTHER INTERFACING GSE Handling Sling			
OTHER INTERPACING GSE	KIL		
N/A	\$		
MOBILITY REQUIREMENTS N/A			
OPERATIONAL MODE: LOCAL X REMOT	BOTH DETAILS		
N/A			
SOFTWARE REQUIREMENTSN/A			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		<u> </u>
NEW D EXISTING D	FUNCTION BLOCK NO.	QUAN	ITITY
MGDIFIED GOMMERCIAL	5.00.7.52.50.1.7.0.	WTR	ETR
REMARKS			
REWARKS	4,30		3
	·		
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		<u> </u>	<u> </u>
			<u> </u>
			<u> </u>
	TOTAL RECUIRED		3

NAME Kick Stage Motor Cradle		ITEM NOI	I-011	
REQUIREMENT SUMMARY Support SRM for				
Provide access provision to all areas	of SRM.			
ITEM DESCRIPTION Rigid structure suppo	rting the SRM in a ver	tical positi	ion fo	r
inspection, cleaning, and checkout.	The structure will pro	vide access	and p	1at-
forms to support personnel and GSE in	SRM processing.			

			·	
DIMENSIONS (FT) L W H	POWER N/A V	Hz A	12	KW
WEIGHT (LBS)FLUID REQUIREM				
ARTICLE OR ASSEMBLY SUPPORTED Kick S	tage Solid Rocket Mot	or		
VEHICLE INTERFACE SRM attach/handlin				
FACILITY INTERFACE				
OTHER INTERFACING GSE <u>Handling Sling K</u>	it			
MOBILITY REQUIREMENTS N/A				
OPERATIONAL MGDE: LOCAL X REMOT	reBoth	DETAILS	·	
N/A		THE THE RESERVE TO THE PARTY OF		
SOFTWARE REQUIREMENTSN/A				
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:			
NEW □ EXISTING □	FUNCTION BLOCK NO.		QUAN	ITITY
MODIFIED COMMERCIAL			WTR	ETR
REMARKS	4.34			/3
		<u> </u>		
	TOTAL REQUIRED			3

MAME Kick Stage Buildup/Checkout Fi	xture ITEM NO	H-012	
REQUIREMENT SUMMARY <u>Support Kick Stag</u>			<u>-</u>
installation, motor installation, cle	aning, and checkout.		
		-	W
ITEM DESCRIPTION <u>Rigid structure prov</u>	iding attachment points to suppor	t the	
kick stage in the vertical position s	tructure will provide access to a	11 are	eas
of the kick stage for cleaning, compo	ment installation/removal, engine		
installation and ground checkout. Li	fting lugs will be provided for m	ovemei	ıt
with or without Tug installed.			
		······································	
		······································	
DIMENSIONS (FT) 16 L 16 W H			
WEIGHT (LBS)FLUID REQUIREM	ENTS N/A PSIG QU	AN	
ARTICLE OR ASSEMBLY SUPPORTED Kick St			
VEHICLE INTERFACE Kick Stage handling			
FACILITY INTERFACE			
OTHER INTERFACING GSE Handling Sling	KIT		
NY / A			
MOBILITY REQUIREMENTS N/A			
OPERATIONAL MODE: LOCAL X REMOT	EBOTHDETAILS		
N/A			
SOFTWARE REQUIREMENTS N/A			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		
NEW □ EXISTING □	FUNCTION BLOCK NO.	QUAN	ITITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS	4.37		3
	·		
	TOTAL BEOLHBED		
	TOTAL REQUIRED		3

NAME Kick Stage SRM Storage Pallet ITEM NO. He REQUIREMENT SUMMARY Support the SRM and its protective cover during stor		
ITEM DESCRIPTION A rigid frame supporting the Tug and its protective cover a vertical position.	r in	Farin
DIMENSIONS (FT) 10 L 10 W 5 H POWER N/A V Hz 6 WEIGHT (LBS) FLUID REQUIREMENTS N/A PSIG QUA	·-· ==···	
ARTICLE OR ASSEMBLY SUPPORTED SRM VEHICLE INTERFACE SRM Handling/Attachment Points FACILITY INTERFACE N/A OTHER INTERFACING GSE Handling Sling Kit		
MOBILITY REQUIREMENTS N/A OPERATIONAL MODE: LOCAL X REMOTE BOTH DETAILS		
SOFTWARE REQUIREMENTS N/A	The transfer of the transfer o	
EQUIPMENT SOURCE: EQUIPMENT ALLOCATION:		
NEW EXISTING FUNCTION BLOCK NO.	QUANTI	TY
MODIFIED COMMERCIAL	NTR E	TR
REMARKS		
Used for storage		
		·
The second control of the second control of		
TOTAL REQUIRED	4	

ITEM NO. H-014
age periods,
stage in its protective
VHz' θ KW
PSIG QUAN.
HDETAILS
CATION:
NO. QUANTITY
WTR ETR
3

NAMETug Storage Pallet	ITEM NO	H-015	
REQUIREMENT SUMMARY Support Tug durin	ng periods of Storage - Attaches t	o Tug a	at
normal Orbiter attach points.			
		· · · · · · · · · · · · · · · · · · ·	
ITEM DESCRIPTION A rigid frame support	ing the Tug and its Protective Co	over in	а
horizontal position.			
			
			-
DIMENSIONS (FT) 32 L 16 W 8 H			
WEIGHT (L8S)FLUID REQUIREN	MENTS N/A PSIG Q	UAN	
ARTICLE OR ASSEMBLY SUPPORTED Tug & Pr	rotective Cover		
VEHICLE INTERFACE Orbiter attach po			
FACILITY INTERFACE			
OTHER INTERFACING GSE Tug Lifting Ri	ings		
MOBILITY REQUIREMENTS N/A			
OPERATIONAL MODE: LOCALREMO	TEBOTHDETAIL	.s	· · · · · · · · · · · · · · · · · · ·
N/A		·	
SOFTWARE REQUIREMENTS N/A			
CAUDALLE COLOCE.	COUPMENT ALLOCATION.		
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION: FUNCTION BLOCK NO.	QUAN	:TITV
NEW [] EXISTING []	- PONCTION BLOCK NO.	WTR	ETR
MODIFIED COMMERCIAL		*****	L 1 11
REMARKS			
Used for storage			
			<u> </u>
		<u></u>	<u> </u>
	TOTAL REQUIRED		6

NAME Tug Engine Handling Kit ITEM NO. H-016	
REQUIREMENT SUMMARY Install and remove engine from Tug and provide support	
for engine during refurbishment or checkout when removed from Tug.	
ITEM DESCRIPTION A rigid engine mounting fixture equipment with lifting lugs	and
a mechanism for rotating and tilting the engine for maintenance, checkout,	
and installation on the Tug.	
DIMENSIONS (FT) 10 L 8 W 10 H POWER N/A V Hz 0	
WEIGHT (LBS)FLUID REQUIREMENTSN/APSIGQUAN,	
ARTICLE OR ASSEMBLY SUPPORTED Tug Engine	
VEHICLE INTERFACE Tug Engine Handling Points	
FACILITY INTERFACE N/A	
OTHER INTERFACING GSE Handling Sling Kit	
21/4	
MOBILITY REQUIREMENTS N/A	
OPERATIONAL MODE: LOCAL X P REMOTE BOTH DETAILS	
N/A	
SOFTWARE REQUIREMENTSN/A	
EQUIPMENT SOURCE: EQUIPMENT ALLOCATION:	
220//MCM //COO///ON,	
	NTITY
	NTITY
NEW D EXISTING D FUNCTION BLOCK NO. QUA	· · · · · · · · · · · · · · · · · · ·
NEW D EXISTING D FUNCTION BLOCK NO. QUANDOIFIED COMMERCIAL D WTR	· · · · · · · · · · · · · · · · · · ·
NEW DEXISTING DEVICTION BLOCK NO. QUANDO DIFIED COMMERCIAL DEVICE WTR	· · · · · · · · · · · · · · · · · · ·
NEW DEXISTING DEVICTION BLOCK NO. QUANDO DIFIED COMMERCIAL DEVICE DEVICE DEVICE DEVICE DEVICE DEVICE DEVICE DE L'ACCEPTANT DE LOCK NO. QUANDO DE L'OCK NO. QUANDO DE L	· · · · · · · · · · · · · · · · · · ·
NEW D EXISTING D FUNCTION BLOCK NO. QUANDOIFIED COMMERCIAL D WTR	· · · · · · · · · · · · · · · · · · ·
NEW D EXISTING D FUNCTION BLOCK NO. QUANDOIFIED COMMERCIAL D WTR	· · · · · · · · · · · · · · · · · · ·
NEW DEXISTING DEVICTION BLOCK NO. QUANDO DIFIED COMMERCIAL DEVICE DEVICE DEVICE DEVICE DEVICE DEVICE DEVICE DE L'ACCEPTANT DE LOCK NO. QUANDO DE L'OCK NO. QUANDO DE L	· · · · · · · · · · · · · · · · · · ·
NEW DEXISTING DEVICTION BLOCK NO. QUANDO DIFIED COMMERCIAL DEVICE DEVICE DEVICE DEVICE DEVICE DEVICE DEVICE DE L'ACCEPTANT DE LOCK NO. QUANDO DE L'OCK NO. QUANDO DE L	· · · · · · · · · · · · · · · · · · ·

NAME Deployment Adapter Storage Pall	LetITE	M NO. H+017
REQUIREMENT SUMMARY Support the Dep.	loyment Adapter during peri	ods of storage.
ITEM DESCRIPTION A rigid platform on t	which the Adapter is placed	and covered
during storage. Attach points are p		
Adapter installed.		
	t	
	And a second division of the second of the s	
27/10/20/20/10/10/20/20/20/20/20/20/20/20/20/20/20/20/20		
DIMENSIONS (FT) 15 L 15 W 8 H	POWER N/A V Hz	<u>θ </u>
WEIGHT (LBS)FLUID REQUIREM	MENTS <u>N/A</u> PSIG	QUAN
ARTICLE OR ASSEMBLY SUPPORTED Deploy	ment Adapter	
VEHICLE INTERFACE <u>Intertank Skirt I</u>	nterface Ring	
FACILITY INTERFACE		
OTHER INTERFACING GSE Handling Sling	Kit	
MOBILITY REQUIREMENTS		niciano de la companya del la companya de la compan
OPERATIONAL MODE: LOCALREMO	TEBOTH	_DETAILS
SOFTWARE REQUIREMENTSN/A		
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:	TOURNITITY
NEW [] EXISTING []	FUNCTION BLOCK NO.	QUANTITY
MODIFIED [] COMMERCIAL []		WTR ETR
REMARKS		
Used for storage		
	Company of the second second second second of the second s	
	TOTAL REQUIRED	5

NAME Handling Sling KitITEM NO. H-	918	
REQUIREMENT SUMMARY Cable assemblies and associated hardware to lift an		
handle the Tug, Tug/SC, Deployment Adapter, Kick Stage, and other GSE.		
ITEM DESCRIPTION Consists of cable assemblies, attachment fittings, spre	ader	
bars used for lifting the Tug and Tug/SC, Deployment Adapter, Kick Stag	e, an	d
other supporting, handling, and checkout GSE.		
DIMENSIONS (FT) L W H POWER N/A V Hz 0	•	ĸw
WEIGHT (LBS) FLUID REQUIREMENTS N/A PSIG QUA		
ARTICLE OR ASSEMBLY SUPPORTED Tug & Tug/SC		
VEHICLE INTERFACE Tug		
FACILITY INTERFACE OPF, TPF	<u> </u>	
OTHERINTERFACING GSE Covers, handling rings, spreader bars, etc.		
MOBILITY REQUIREMENTS N/A		
OPERATIONAL MODE: LOCAL X REMOTE BOT'1 DETAILS		
SOFTWARE REQUIREMENTSN/A		
EQUIPMENT SOURCE: EQUIPMENT ALLOCATION:		
NEW ☐ EXISTING ☐ FUNCTION BLOCK NO.	QUAN	TY
MODIFIED COMMERCIAL	WTR	ETR
REMARKS 1.1, 2.8, 2.21, 4.3, 4.11, 4.33,		
4.36, 4.37, 4.48, 5.15, 5.17,		
5.22, 5.23, 5.24, 6.1	**	
	1	3
		L

NAME Tug Protective Cover Kit	ITEM NO	H-019	
REQUIREMENT SUMMARY Sealable covers f			Om
moisture and maintaining cleanliness.			
ITEM DESCRIPTION Two layer cover with	the inner cover made from imperv	ious ma	ateria
with sealable closures to enhance cle	eanliness. The outer cover is a	neavy 1	Eabric
covering the Tug and attaching to a s	supporting fixture. The kit incl	udes a	
free breathing desiccant assemply wit	th air filters to maintain a clas	s 100	700
clean environment during shipment or	storage.		
DIMENSIONS (FT) 301 L 15 W 15 H	POWER N/A V Hz	9	KW
WEIGHT (LBS)FLUID REQUIREM	NENTS N/A PSIG Q	UAN	
ARTICLE OR ASSEMBLY SUPPORTED		······································	
VEHICLE INTERFACE <u>External cover for</u>	: Tug & Adapter		
FACILITY INTERFACE			
OTHER INTERFACING GSE <u>Desiccant Ki</u> t	***************************************		
			<u>. </u>
MOBILITY REQUIREMENTS <u>Attaches to Tu</u> g	Transportation GSE	 	
OPERATIONAL MODE: LOCALREMOT	reBothDetail	.S	
SOFTWARE REQUIREMENTS N/A			
EQUIPMENT COURSE			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:	1	
NEW EXISTING	FUNCTION BLOCK NO.		ITEY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS See attached Figure.	1.2, 2.21, 5.13, 5.14, 5 _{.5} 22,	1	6
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		<u> </u>	<u> </u>
			,
	TOTAL REQUIRED	1	6

NAMETug Desiccant Kit	ļ	TEM NO. <u>H-0</u>	20	
REQUIREMENT SUMMARY Provide dry ai				
tanks, pressure vessels, fuel cell				
ITEM DESCRIPTION Desiccant breather			ts.	
flexible and rigid ducts to attach	to Tug pressure/propellant	/reactant v	essels	
The kit will fit inside of the Tug	Protec'ive Cover Kit.			
			_	
	1			
DIMENSIONS (FT) L W	H POWER N/A V H	:θ_		KW
WEIGHT (LBS)FLUID REQUIR	EMENTS N/A PSIG	AUD	٧	
ARTICLE OR ASSEMBLY SUPPORTED				
VEHICLE INTERFACE <u>Tug-Orbiter inter</u>	face connectors and APS Ve	nt		
FACILITY INTERFACE				
OTHER INTERFACING GSE		<u> </u>		
				-
MOBILITY REQUIREMENTS Air transport	a: e attached to Tug (rapi	d breathing	}	
OPERATIONAL MODE: LOCALREN	NOTEBOTH	DETAILS		
	T. T			
SOFTWARE REQUIREMENTSN/A				
EQUIPMENT COURSE				
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:			
NEW _ EXISTING _	FUNCTION BLOCK NO.	 	DUANTI	
MODIFIED COMMERCIAL		V	VTR E	TR
REMARKS *	4.2, 4,49			6
Also utilized during storage				
	TOTAL REQUIRED			6

NAME <u>Battery Handling Kit</u>		4 NO. H-021	
REQUIREMENT SUMMARY Move and as			
batteries.			
ITEM DESCRIPTION The battery kit	consists of a manipulator, carr	ier, handler,	
and fastening devices mounted on	n a dolly.		
		Post Control of Contro	
MUM = 1			
DIMENSIONS (FT) L W	H POWER N/A V Hz	θ	KW
WEIGHT (LBS)FLUID REQ	UIREMENTS N/A PSIG	QUAN	
ARTICLE OR ASSEMBLY SUPPORTED <u>F1</u> :			
VEHICLE INTERFACE Flight batterio			
FACILITY INTERFACE N/A			
OTHER INTERFACING GSE N/A			
MOBILITY REQUIREMENTS Mobile doll			
OPERATIONAL MODE: LOCAL *	REMOTE BOTH	DETAILS	
N/A			
SOFTWARE REQUIREMENTSN/A			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		
NEW [] EXISTING []	FUNCTION BLOCK NO.	QUANTIT	
MODIFIED COMMERCIAL		WTR ET	
REMARKS	1.7, 5.7	1 3	
	1.,, 7.,		<u>'</u>
			
			,
			
	TOTAL DECUMES		
	TOTAL REQUIRED	1 1 3	3

NAME <u>Air Carry Tiedown Kit</u>	1TEM NO H-022		
REQUIREMENT SUMMARY Secure Tug trans			
ITEM DESCRIPTION The air carry tiedown	kit contains the cable assembl	ies and	
attach fittings used to secure the T	ug, mounted on the Tug Trantain	er, in th	e
cargo area of an airplane.			
			
		············	
DIMENSIONS (FT)LW1	H POWERN/A V Hz	в	KW
WEIGHT (LBS)FLUID REQUIRE		•	
ARTICLE OR ASSEMBLY SUPPORTED Tug			
VEHICLE INTERFACE N/A			•
FACILITY INTERFACE Airplane Cargo Bay			
OTHER INTERFACING GSE Tug Transtainer	•	_ 	
MOBILITY REQUIREMENTS N/A			
OPERATIONAL MODE: LOCAL X REMO	DETBOTHDET	AILS	
N/A			
SOFTWARE REQUIREMENTS N/A			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		·
NEW EXISTING	FUNCTION BLOCK NO.	QUAN	NTITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS	2.23, 4.1, 4.51	1	2
	TOTAL REQUIRED	1	2

NAME <u>Transport Data Recorder</u>	ITEM NO. <u>H</u>	023	
REQUIREMENT SUMMARY Record Temperature, humidity, shock during long range			
transportation functions			
ITEM DESCRIPTION Multi-channel analog re	corder that will accompany the Tu	B	
during transportation between launch	sites, from factory to launch site	or f	rom
alternate sites to SHA. It will reco	rd the environmental conditions su	ırroun	ding
the Tug, i.e. time, temperature, humi	dity, shock (acceleration)		· · · · · · · · · · · · · · · · · · ·
		·	
		-	- 114
DIMENSIONS (FT) 2.5 L 2 W 1.5 H			
WEIGHT (LBS)FLUID REQUIREM	ENTSN/APSIGQU	AN	
			
ARTICLE OR ASSEMBLY SUPPORTED Tug			
VEHICLE INTERFACE			
FACILITY INTERFACE			
OTHER INTERFACING GSE		·····	
MOBILITY REQUIREMENTS <u>Carry-near, air</u>	transportable		
OPERATIONAL MODE: LOCAL _x REMOT	EBOTHDETAILS		
		 _	· · · · · · · · · · · · · · · · · · ·
SOFTWARE REQUIREMENTSN/A			
EQUIPMENT SOURCE:	FOURMENT ALL OCATION	·	
	FUNCTION BLOCK NO.	0	(Tr) Tr > /
	PONCTION BLOCK NO.	QUAN	
MODIFIED COMMERCIAL E	2 24 4 2 4 40	VVIR	ETR 2
REMARKS	2.24, 4.2, 4.49		
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		.	<u> </u>
	TOTAL REQUIRED		2

NAMETug Transtainer	,TE	M NO. H-024
REQUIREMENT SUMMARY Support lor	ng distance air transport of Tug,	include
environmental control equipmen	nt	
ITEM DESCRIPTION Low profile train	iler capable of supporting a cover	ed Tug during
air transportation required by	y manufacturing location or orbite	r landing at an
alternate site. Wheels are h	ydraulically retractable and tie d	lowns are provide
for attachment to the aircraft	t.	
	6 H POWER N/A V Hz	
	REQUIREMENTS N/A PSIG	
7 2010 11	Wa 1316	QOAN
ARTICLE OR ASSEMBLY SUPPORTED	ug and adapter and spacecraft	
	er orbiter attach points	
	Sling Kit	
Retractat MOBILITY REQUIREMENTS <u>stable mo</u>	ble wheels for ground transportati	on and
OPERATIONAL MODE: LOCALX	REMOTE BOTH	DETAILS
SOFTWARE REQUIREMENTS N/A		
EQUIPMENT SOURCE:	TEOLISTIC ALLOCATION	
	FUNCTION BLOCK NO.	CHANTITY
- Control Cont	FONCTION BLOCK NO.	QUANTITY
MODIFIED COMMERCIAL REMARKS	11111111111	WTR ETI
TEMATING	1.1, 1.4, 2.21, 2.22,	
	4.49, 4.50, 5.9, 5.22	1 2
,		
78.5		
	TOTAL OFFICE	
	TOTAL REQUIRED	1 2

NAME Tug Lifting Rings	ITEM NO. H-	025	
REQUIREMENT SUMMARY Provide lifting p			
Tug in the horizontal positon.			
ITEM DESCRIPTION Two rings, fore and aft	. used to provide lifting points f	or th	e
Tug. The rings are segmented for eas			
The rings are also used to provide su			
position.			
Provident State of the State of			
			-
		~~ 	
DIMENSIONS (FT) L W H	POWER N/A V Hz 😝		KW
WEIGHT (LBS) FLUID REQUIREM			
ARTICLE OR ASSEMBLY SUPPORTED Tug			
VEHICLE INTERFACE Tug			
FACILITY INTERFACE			
OTHER INTERFACING GSE Tug Workstands,	Handling Sling Kit		
OTTEN INTENTIONS OF			
MOBILITY REQUIREMENTS		<u> </u>	
OPERATIONAL MODE: LOCALREMOT			
GPERATIONAL MODE.			
SOFTWARE REQUIREMENTSN/A			
SOFTWARE RECOMENTS			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		····
NEW EXISTING	FUNCTION BLOCK NO.	QUAN	ITITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS	1.1, 4.3, 5.9, 5.12, 5.22	1	3
	TOTAL OF OLUCES		
	TOTAL REQUIRED	1	3

NAME Inspection Workstands	ITEM NOH	-026	
REQUIREMENT SUMMARY <u>Fortable Work Plat</u>	•		
provide access to Tug/kick stage/spac			
ITEM DESCRIPTION The workstands will be	portable and self supporting. T	hey wil	1
he used at random to provide access f			
replacement, and final closeout activ			
		n	مرور معمور
DIMENSIONS (FT) L W H			
WEIGHT (LBS)FLUID REQUIREM	ENTSPSIGC	IUAN	. —
ARTICLE OR ASSEMBLY SUPPORTED Fersonne	1		
VEHICLE INTERFACE			
FACILITY INTERFACE			_
OTHER INTERFACING GSE Tug workstands			_
		· · · · · · · · · · · · · · · · · · ·	
MOBILITY REQUIREMENTS N/A			
OPERATIONAL MODE: LOCALREMOT		LS	
	-		
SOFTWARE REQUIREMENTS			
			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		
NEW EXISTING	FUNCTION BLOCK NO.		ITITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS	1.2, 1.3, 2.9, 4.12, 2.7	1	9
	<u> </u>	-	<u> </u>
			
	TOYAL REQUIRED	1	9

NAME Spacecraft Docking Simulator	ITE	M NO. <u>H-027</u>
REQUIREMENT SUMMARY The simulator w		
stage to spacecraft interface inter		
ITEM DESCRIPTION The simulator will he		mine latching
retention forces and interface late		
		·
DIMENSIONS (FT)LWW		
WEIGHT (LBS)FLUID REQUIRE	MENTS PSIG	QUAN
ARTICLE OR ASSEMBLY SUPPORTED		
VEHICLE INTERFACE		
FACILITY INTERFACE		
OTHER INTERFACING GSE		- <u>-</u>
THE COURT OF THE C		
MOBILITY REQUIREMENTSREMO		DETAILS
OPERATIONAL MODE: LOCALTIEMI	016B01H	
SOFTWARE REQUIREMENTS		
SOFTWARE REGISTERIES		
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:	
NEW EXISTING	FUNCTION BLOCK NO.	QUANTITY
MODIFIED COMMERCIAL		WTR ETR
REMARKS	5.3	1
,		
	TOTAL REQUIRED	1

REQUIREMENT SUMMARY Support long distance air transport of the kick stage, including environmental control. ITEM DESCRIPTION	NAME Kick Stage Transtainer	·	ITEM NO	н-028	
ITEM DESCRIPTION Low profile trailer capable of supporting a covered transtainer during air transportation required by manufacturing location or orbiter landing at an alternate site. Wheels are hydraulically retractable and tie downs are provided for attachment to the aircraft. DIMENSIONS (FT) L W H _ POWER N/A _ V Hz Ø KW WEIGHT (LBS) FLUID REQUIREMENTS N/A _ PSIG QUAN ARTICLE OR ASSEMBLY SUPPORTED Kick Stage	1				
ITEM DESCRIPTION Low profile trailer capable of supporting a covered transtainer during air transportation required by manufacturing location or orbiter landing at an alternate site. Wheels are hydraulically retractable and tie downs are provided for attachment to the aircraft. DIMENSIONS (FT) L W H _ POWER N/A _ V Hz Ø KW WEIGHT (LBS) FLUID REQUIREMENTS N/A _ PSIG QUAN ARTICLE OR ASSEMBLY SUPPORTED Kick Stage					
during air transportation required by manufacturing location or orbiter landing at an alternate site. Wheels are hydraulically retractable and tie downs are provided for attachment to the aircraft. DIMENSIONS (FT) L W H POWER N/A V Hz \$\theta KW WEIGHT (LBS) FLUID REQUIREMENTS N/A PSIG QUAN. ARTICLE OR ASSEMBLY SUPPORTED Kick Stage					
landing at an alternate site. Wheels are hydraulically retractable and tie downs are provided for attachment to the aircraft. DIMENSIONS (FT)	ITEM DESCRIPTION Low profile trailer	capable of supporti	ng a covered tr	anstai	ner
DIMENSIONS (FT) L W H _ POWER N/A _ V Hz Ø KW WEIGHT (LBS) FLUID REQUIREMENTS N/A PSIG QUAN ARTICLE OR ASSEMBLY SUPPORTED Kick Stage VEHICLE INTERFACE FACILITY INTERFACE OTHER INTERFACING GSE	during air transportation required	d by manufacturing l	ocation or orbi	ter	
DIMENSIONS (FT) L W H POWER N/A V Hz Ø KW WEIGHT (LBS) FLUID REQUIREMENTS N/A PSIG QUAN. ARTICLE OR ASSEMBLY SUPPORTED Kick Stage VEHICLE INTERFACE OTHER INTERFACE OTHER INTERFACE OTHER INTERFACING GSE MOBILITY REQUIREMENTS Over the road OPERATIONAL MODE: LOCAL REMOTE BOTH DETAILS SOFTWARE REQUIREMENTS EQUIPMENT SOURCE: EQUIPMENT ALLOCATION: NEW SEXISTING FUNCTION BLOCK NO. QUANTITY MODIFIED COMMERCIAL NOTE STANDARD SOME STANDAR	landing at an alternate site. Who	sels are hydraulical	ly retractable	and ti	е
DIMENSIONS (FT) L W H POWER N/A V Hz 6 KW WEIGHT (LBS) FLUID REQUIREMENTS N/A PSIG QUAN. ARTICLE OR ASSEMBLY SUPPORTED Kick Stage VEHICLE INTERFACE FACILITY INTERFACE OTHER INTERFACING GSE MOBILITY REQUIREMENTS Over the road OPERATIONAL MODE: LOCAL REMOTE BOTH DETAILS SOFTWARE REQUIREMENTS EQUIPMENT SOURCE: EQUIPMENT ALLOCATION: NEW EXISTING FUNCTION BLOCK NO. QUANTITY MODIFIED COMMERCIAL FINANCES REMARKS 4.30, 4.48 2 2	downs are provided for attachment	to the aircraft.			
DIMENSIONS (FT) L W H POWER N/A V Hz # KW WEIGHT (LBS) FLUID REQUIREMENTS N/A PSIG QUAN. ARTICLE OR ASSEMBLY SUPPORTED Kick Stage VEHICLE INTERFACE FACILITY INTERFACE OTHER INTERFACING GSE MOBILITY REQUIREMENTS Over the road OPERATIONAL MODE: LOCAL REMOTE BOTH DETAILS SOFTWARE REQUIREMENTS EQUIPMENT SOURCE: EQUIPMENT ALLOCATION: NEW DEXISTING DETAILS FUNCTION BLOCK NO. QUANTITY MODIFIED COMMERCIAL DETAILS REMARKS 4.30, 4.48 2 2					
DIMENSIONS (FT) L W H POWER N/A V Hz # KW WEIGHT (LBS) FLUID REQUIREMENTS N/A PSIG QUAN. ARTICLE OR ASSEMBLY SUPPORTED Kick Stage VEHICLE INTERFACE FACILITY INTERFACE OTHER INTERFACING GSE MOBILITY REQUIREMENTS Over the road OPERATIONAL MODE: LOCAL REMOTE BOTH DETAILS SOFTWARE REQUIREMENTS EQUIPMENT SOURCE: EQUIPMENT ALLOCATION: NEW DEXISTING DETAILS FUNCTION BLOCK NO. QUANTITY MODIFIED COMMERCIAL DETAILS REMARKS 4.30, 4.48 2 2					
DIMENSIONS (FT) L W H POWER N/A V Hz 6 KW WEIGHT (LBS) FLUID REQUIREMENTS N/A PSIG QUAN. ARTICLE OR ASSEMBLY SUPPORTED Kick Stage VEHICLE INTERFACE FACILITY INTERFACE OTHER INTERFACING GSE MOBILITY REQUIREMENTS Over the road OPERATIONAL MODE: LOCAL REMOTE BOTH DETAILS SOFTWARE REQUIREMENTS EQUIPMENT SOURCE: EQUIPMENT ALLOCATION: NEW EXISTING FUNCTION BLOCK NO. QUANTITY MODIFIED COMMERCIAL FETTER REMARKS 4.30, 4.48 2 2					
DIMENSIONS (FT) L W H POWER N/A V Hz 6 KW WEIGHT (LBS) FLUID REQUIREMENTS N/A PSIG QUAN. ARTICLE OR ASSEMBLY SUPPORTED Kick Stage VEHICLE INTERFACE FACILITY INTERFACE OTHER INTERFACING GSE MOBILITY REQUIREMENTS Over the road OPERATIONAL MODE: LOCAL REMOTE BOTH DETAILS SOFTWARE REQUIREMENTS EQUIPMENT SOURCE: EQUIPMENT ALLOCATION: NEW EXISTING FUNCTION BLOCK NO. QUANTITY MODIFIED COMMERCIAL FINANCES REMARKS 4.30, 4.48 2 2					= -
WEIGHT (LBS) FLUID REQUIREMENTS N/A PSIG QUAN. ARTICLE OR ASSEMBLY SUPPORTED Kick Stage VEHICLE INTERFACE FACILITY INTERFACE OTHER INTERFACING GSE MOBILITY REQUIREMENTS Over the road OPERATIONAL MODE: LOCAL REMOTE BOTH DETAILS SOFTWARE REQUIREMENTS EQUIPMENT SOURCE: EQUIPMENT ALLOCATION: NEW EXISTING FUNCTION BLOCK NO. QUANTITY MODIFIED COMMERCIAL MTR REMARKS 4.30, 4.48 2				Δ	KW
ARTICLE OR ASSEMBLY SUPPORTED Kick Stage VEHICLE INTERFACE FACILITY INTERFACE OTHER INTERFACING GSE MOBILITY REQUIREMENTS Over the road OPERATIONAL MODE: LOCAL REMOTE BOTH DETAILS SOFTWARE REQUIREMENTS EQUIPMENT SOURCE: EQUIPMENT ALLOCATION: NEW EXISTING FUNCTION BLOCK NO. QUANTITY MODIFIED COMMERCIAL MEMORES REMARKS 4.30, 4.48 2					
VEHICLE INTERFACE FACILITY INTERFACE OTHER INTERFACING GSE MOBILITY REQUIREMENTS Over the road OPERATIONAL MODE: LOCAL REMOTE BOTH DETAILS SOFTWARE REQUIREMENTS EQUIPMENT SOURCE: EQUIPMENT ALLOCATION: NEW EXISTING FUNCTION BLOCK NO. QUANTITY MODIFIED COMMERCIAL META REMARKS 4.30, 4.48 2 1 1 1 1 1 1 1 1 1 1 1 1	WEIGHT (LBS)	CMCM19 M/W	13100	.UMIV	
VEHICLE INTERFACE FACILITY INTERFACE OTHER INTERFACING GSE MOBILITY REQUIREMENTS Over the road OPERATIONAL MODE: LOCAL REMOTE BOTH DETAILS SOFTWARE REQUIREMENTS EQUIPMENT SOURCE: EQUIPMENT ALLOCATION: NEW EXISTING FUNCTION BLOCK NO. QUANTITY MODIFIED COMMERCIAL META REMARKS 4.30, 4.48 2 1 1 1 1 1 1 1 1 1 1 1 1	ARTICLE OR ASSEMBLY SUPPORTED Kick	s Stage			
FACILITY INTERFACE OTHER INTERFACING GSE MOBILITY REQUIREMENTS Over the road OPERATIONAL MODE: LOCAL REMOTE BOTH DETAILS SOFTWARE REQUIREMENTS EQUIPMENT SOURCE: EQUIPMENT ALLOCATION: NEW EXISTING FUNCTION BLOCK ND. QUANTITY MODIFIED COMMERCIAL MTR REMARKS 4.30, 4.48 2 2 1 1 1 1 1 1 1 1 1 1 1 1		· — · — · — · — · — · · — · · — · · — ·			
MOBILITY REQUIREMENTS _Over_the_road OPERATIONAL MODE: LOCALREMOTEBOTHDETAILS SOFTWARE REQUIREMENTS EQUIPMENT SOURCE:					
OPERATIONAL MODE: LOCAL REMOTE BOTH DETAILS SOFTWARE REQUIREMENTS EQUIPMENT SOURCE: EQUIPMENT ALLOCATION: NEW DEXISTING DEX					
OPERATIONAL MODE: LOCAL REMOTE BOTH DETAILS SOFTWARE REQUIREMENTS EQUIPMENT SOURCE: EQUIPMENT ALLOCATION: NEW DEXISTING DEX					
SOFTWARE REQUIREMENTS EQUIPMENT SOURCE: REW EXISTING FUNCTION BLOCK NO. QUANTITY MODIFIED COMMERCIAL WTR ETR REMARKS 4.30, 4.48 2	MOBILITY REQUIREMENTS Over the road				
EQUIPMENT SOURCE: REW EXISTING FUNCTION BLOCK NO. QUANTITY MODIFIED COMMERCIAL WTR ETR REMARKS 4.30, 4.48 2	OPERATIONAL MODE: LOCALREM	IOTEBOTH_	DETAIL	.s	
EQUIPMENT SOURCE: REW EXISTING FUNCTION BLOCK NO. QUANTITY MODIFIED COMMERCIAL					
NEW EXISTING FUNCTION BLOCK NO. QUANTITY MODIFIED COMMERCIAL WTR ETR REMARKS 4.30, 4.48 2	SOFTWARE REQUIREMENTS				·
NEW EXISTING FUNCTION BLOCK NO. QUANTITY MODIFIED COMMERCIAL WTR ETR REMARKS 4.30, 4.48 2	FOLLOWENT SOURCE.	EQUIDAGE A LEGAL	FLOAN		
MODIFIED COMMERCIAL CO				Tours	
REMARKS 4.30, 4.48 2			·•		1
		1 00 1 10		VVIH	-
TOTAL REQUIRED 2	11-MARING	4.30, 4.48			2
TOTAL REQUIRED 2			-	1	
TOTAL REQUIRED 2				 	
TOTAL REQUIRED 2				-	
TOTAL REQUIRED 2				+	
TOTAL REQUIRED 2					
TOTAL REQUIRED 2				-	
		TOTAL REQUIRED		+	,

NAME Vertical Adapter	ITEM NO). <u>H-029</u>
REQUIREMENT SUMMARY Provide suppo		
handling of Tug/Payload,		
ITEM DESCRIPTION Fixture that inte	rfaces with PCU elevator system	providing
attachment points for the Tug. Pro		
and remove Tug from fixture.		
		· · · · · · · · · · · · · · · · · · ·
DIMENSIONS (FT) 18 L 18 W 35		
WEIGHT (LBS)FLUID REQUI	REMENTS N/A PSIG PSIG	QUAN
ARTICLE OR ASSEMBLY SUPPORTEDTug/		
VEHICLE INTERFACE <u>Tug-Orbiter atta</u>	ch points	
FACILITY INTERFACE <u>PCU</u> <u>elevator</u>	110000000000000000000000000000000000000	—
OTHER INTERFACING GSE PCR payload	manipulator	
MOBILITY REQUIREMENTS <u>Installation</u>		
OPERATIONAL MODE: LOCAL X RE	MOTEBOTHDE	TAILS
SOFTWARE REQUIREMENTSN/A		
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:	
NEW () EXISTING []	FUNCTION BLOCK NO.	QUANTITY
MODIFIED COMMERCIAL		WTR ETR
REMARKS	5 22 5 24	1
REMARKS	5.23, 5.24	
	TOTAL REQUIRED	1

NAME Kick Stage Motor Support Fixture	ITEM NO	H-030	
REQUIREMENT SUMMARY Provide support for and access to			
		·	
		سعبيات الاست	
ITEM DESCRIPTION Support fixture to support kick stage	motor in a ver	tical p	ositic
position for inspection and cleaning. Access platform	s to permit phy	s <u>ical</u>	
access to all external areas of motor.			
DIMENSIONS (FT) 16 L 16 W 12 H POWER N/A V	' Hz	θ	KW
WEIGHT (LBS)FLUID REQUIREMENTS N/A			
WEIGHT (255)			
ARTICLE OR ASSEMBLY SUPPORTED <u>Kick Stage Motor</u>			
VEHICLE INTERFACE <u>Motor - Stage attach brackets</u>			
FACILITY INTERFACE N/A			
OTHER INTERFACING GSE N/A			
MOBILITY REQUIREMENTS N/A			
OPERATIONAL MODE: LOCAL X REMOTE BOTH	DETA	ILS	
SOFTWARE REQUIREMENTS N/A			
EQUIPMENT SOURCE: EQUIPMENT ALLOCA	ATION:		
NEW A EXISTING D FUNCTION BLOCK N		QUAI	NTITY
MODIFIED COMMERC AL		WTR	ETR
REMARKS 4.34			3
		1	
	•		
			1
			
TOTAL REQUIRED			3

NAME <u>TPF Manipulator Option 1</u>	ITEM	NO. <u>H</u> -031	
REQUIREMENT SUMMARY			
		-,·-,·	
ITEM DESCRIPTION <u>A vehicle similar in a</u>	appearance and function to a	fork lift	
truck. In place of the familiar tine	this vehicle has arms that p	partly encirc	le -
lift - manipulate a complete Tug, Kick	Stage and Payload. The est	imates load	
would be 6(six) tons.			=
Power to be electric hydraulic		·	
			.
DIMENSIONS (FT) 30 L 10 W 10 H			
WEIGHT (LBS)FLUID REQUIREN	MENTSPSIG	QUAN	
ARTICLE OR ASSEMBLY SUPPORTED <u>Complete</u>		*	· ·
VEHIÇLE INTERFACE			
FACILITY INTERFACE		·	-
OTHER INTERFACING GSE			
MOBILITY REQUIREMENTS REMO		DETAILS	
OPERATIONAL MODE: LUCAL _ X REMO	OIL	PE I (VIE)	
SOFTWARE REQUIREMENTS			
SOFTWARE RECOTREMENTS	, , , , , , , , , , , , , , , , , , ,		
EQUIPMENT SOURCE.	EQUIPMENT ALLOCATION:	······································	
NEW 🖺 EXISTING 🗆	FUNCTION BLOCK NO.	QUAN	TITY
MODIFIED COMMERCIAL	_	WTR	ETR
REMARKS .			
	,		
	`		
	TOTAL REOUIRED		
1	1 O TAL HEADINED		

NAME Tug Erection Fixture	ITE	M NO. <u>H-</u> 032
REQUIREMENT SUMMARY <u>Raise Tug fro</u>		
ITEM DESCRIPTION A portable fixture	(with tie-downs) consisting of	of a pivoting
truss and ring assembly to which t	he aft-end of the Tug is faste	ened. The Tug
is raised from horizontal to verti	cal position with a crane hool	on the forward
end.		
NA.		
DIMENSIONS (FT) x L x W x WEIGHT (LBS) X FLUID REQU		
WEIGHT (EBS) Coss field	More 1010	207.11.
ARTICLE OR ASSEMBLY SUPPORTED Tug		
VEHICLE INTERFACE Aft truss		
FACILITY INTERFACE <u>Tie-down points</u>	, crane.	
OTHER INTERFACING GSE		
MOBILITY REQUIREMENTS Portable		
OPERATIONAL MODE: LOCAL x R	EMOTEBOTH	DETAILS
SOFTWARE REQUIREMENTSN/A		
EQUIPMENT SOURCE;	EQUIPMENT ALLOCATION:	
NEW 図 EXISTING □	FUNCTION BLOCK NO.	QUANTITY
MODIFIED COMMERCIAL		WTR ETR
REMARKS		
		<u>.</u>
	TOTAL	
	TOTAL REQUIRED]]

NAME Aft Umbilical Servicing Unit	ITEM NO.	P-001	
REQUIREMENT SUMMARY Safely dispose o			•
self-propelled unit, capable of pro	_		University to
ITEM DESCRIPTION Self propelled wheeled	unit used on the runway to deserv	ice th	ıe
Tug LH, tank after an abort flight	landing. Unit would provide remo	te	
connected interface to the orbiter			. У
of purge gas.			
·			
DIMENSIONS (FT) 50 L 12 W 20 H	POWERVHz 0		KW
WEIGHT (LBS)FLUID REQUIREM			
	2		
ARTICLE OR ASSEMBLY SUPPORTED Tug			
VEHICLE INTERFACE <u>Orbiter aft umbilica</u>			
FACILITY INTERFACE			
OTHER INTERFACING GSE			
			-
MOBILITY REQUIREMENTS Over-the-road, se	lf-powered		
OPERATIONAL MODE: LOCAL X REMOT		,	
SOFTWARE REQUIREMENTS N/A			
301 WAIL HEADTHEINEN 10			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		
NEW 🗆 EXISTING 🗅	FUNCTION BLOCK NO.	QUAN	ITITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS	1.8, 1.9, 1.11, 1.12,	1	2
	1,0,1 1,0,1 1,0,1		
			
			<u> </u>
	TOTAL REQUIRED	1	2

NAME Fuel Cell GN, Purge Unit	ITEM N	IO. <u>P-002</u>
REQUIREMENT SUMMARY Purge the fue		
	urge the FC water system.	
The County of th		
ITEM DESCRIPTION The Fuel Cell Purg	e Unit is a nortable requisted Ch	l supply with
	r holding tank.	-
moses ofservince is and a water	N AND THE PARTY	
		
	H cours w/A M M-	a 222
DIMENSIONS (FT) L W		
WEIGHT (LBS)FLUID REQU	JIREMENTSPSIG	QUAN
m -	Fuel Cell	
ARTICLE OR ASSEMBLY SUPPORTED Tug		
VEHICLE INTERFACE		
FACILITY INTERFACE		
OTHER INTERFACING GSE		<u></u>
MOBILITY REQUIREMENTS Capable of h		
OPERATIONAL MODE: LOCAL *	REMOTEBOTHD	ETAILS
SOFTWARE REQUIREMENTS		
SOUR PURSON TO SOUR TO	Taguara	
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:	T
NEW [] EXISTING []	FUNCTION BLOCK NO.	QUANTITY
MODIFIED COMMERCIAL		WTR ETR
REMARKS	1.14, 2.4, 2.19, 4.9	1 2
	TOTAL REQUIRED	
	TOTAL NEGOTINED	1 2

NAME Fuel Cell Water Supply Unit ITEM NO. P-003
REQUIREMENT SUMMARY Charge the fuel cell cooling system and circulate water
through the cooling system during load tests.
ITEM DESCRIPTION Cart mounted supply of (TBS) water equipped with a pump.
·
DIMENSIONS (FT) L W H POWER 120 V 69 Hz 1 $oldsymbol{ heta}$ K
WEIGHT (LBS) FLUID REQUIREMENTS H ₂ 0 PSIG 10-30 QUAN.
7.2.0.7.
ARTICLE OR ASSEMBLY SUPPORTED Tug Fuel Cell
VEHICLE INTERFACE
FACILITY INTERFACE
OTHER INTERFACING GSE
MOBILITY REQUIREMENTS
OPERATIONAL MODE: LOCAL X REMOTE BOTH DETAILS
SOFTWARE REQUIREMENTS
EQUIPMENT SOURCE: EQUIPMENT ALLOCATION:
NEW EXISTING FUNCTION BLOCK NO. QUANTITY
MODIFIED COMMERCIAL WTR ET
REMARKS
Used during refurbishment of
fuel cells
TOTAL REQUIRED 2

NAME Fuel Cell GH, Accumulator Ch	narge Unit		ITEM NO. P-	-004	
REQUIREMENT SUMMARY <u>Provide</u> adjust					
operation and charging.					
ITEM DESCRIPTION The fuel cell GH,	accumulator	charge unit co	nsists of c	ert.	
(TBS) psia GH, supply contain					
control and flow totalizing s					
			······································		
DIMENSIONS (FT)LW	H POWE	RN/A V	Hz i	9	KW
WEIGHT (LBS)FLUID REQ					
ARTICLE OR ASSEMBLY SUPPORTED Tug	fuel cell				
VEHICLE INTERFACE					
FACILITY INTERFACE					
OTHER INTERFACING GSE					
			,		
MOBILITY REQUIREMENTS Portable	cost	<u> </u>			
OPERATIONAL MODE: LOCAL x				s	
OF ETIATIONAL MODE.					
SOFTWARE REQUIREMENTSN/A					
EQUIPMENT SOURCE:	EQUIPME	ENT ALLOCATION:			
NEW EXISTING	FUNCTIO	ON BLOCK NO.		QUAN	TITY
MODIFIED COMMERCIAL				WTR	ETR
REMARKS					1
Used during refurbishment					
of fuel cells					
OI Iddi della					
				1	
				+	
				 	
				 	
				 	
	TOTAL F	REQUIRED		_	1_

NAME Fuel Cell GO Accumulator Char	ge Unit ITEM	NO. P-005
REQUIREMENT SUMMARYProvide_adjusts	able regulated CO supply for f	uel cell
operation and charging	-	
ITEM DESCRIPTION The fuel cell GO, acc	cumulator charge unit consists	of cart (TBS)
psia GO, supply container, pipi		
flow control totalizing systems		
,		
The state of the s	**	A
DIMENSIONS (FT) L W		
WEIGHT (LBS)FLUID REQUII	PSIG 200-	2000QUAN
ARTICLE OR ASSEMBLY SUPPORTED Tug	fuel cell	
versities interface		
TAKETOTY INTERFACE		
QTEER INTERFACING GSE		
MOBILITY REQUIREMENTS Portable	Carr	
OPERATIONAL MODE; LOCAL X REI	МОТЕ ВОТН х [DETAILS
SOFTWARE REQUIREMENTSN/A		
SOURCE		
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:	
NEW D EXISTING D	FUNCTION BLOCK NO.	QUANTITY
MODIFIED COMMERCIAL		WTR ETR
REMARKS		
Used for refurbishment of		
fuel cells		
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
	TOTAL REQUIRED	1

NAME Engine Alignment Kit	ITEM NO.	P-006	
REQUIREMENT SUMMARY Align engine with Tug			
The state of the s			
ITEM DESCRIPTION <u>Kit containing dial</u> in	ndicators, throat plugs, nozzle ex	kit	
plane spider device, shims and mo	•		
		78 to - 100 - 1	
DIMENSIONS (FT) L W H			
WEIGHT (LBS)FLUID REQUIREM	ENTS N/A PSIG QU	IAN	
ARTICLE OR ASSEMBLY SUPPORTED N/A		*****	
VEHICLE INTERFACE Tug Engine			
FACILITY INTERFACE N/A			
OTHER INTERFACING GSE N/A		,	
MOBILITY REQUIREMENTS Carry near kit			
OPERATIONAL MODE: LOCAL * REMOT	FEBOTHDETAILS	·	
7/1			
SOFTWARE REQUIREMENTSN/A			
EQUIPMENT SOURCE;	EQUIPMENT ALLOCATION:		
NEW EXISTING	FUNCTION BLOCK NO.	QUAN	 ∤TITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS	4.18, 2.12	 	2
	7-10, 2-12		
		 	
		 	
		<u> </u>	
1		-	
	TOTAL BEOLUBED	 	2
	TOTAL REQUIRED	1	

NAME Tug Engine Actuator Servicing &	tt ITEM NO. 1	2-007	
REQUIREMENT SUMMARY Special tools to			
and engine support		·	
ITEM DESCRIPTION <u>Kits containing stand-o</u>			· · · · · · · · · · · · · · · · · · ·
	to service, remove and install the	engi:	<u></u>
actuators.			
DIMENSIONS (FT) L W H			
WEIGHT (LBS)FLUID REQUIREN	WENTS N/A PSIG CC	JAN	
ARTICLE OR ASSEMBLY SUPPORTED Tug En	gine		
VEHICLE INTERFACE <u>Engine actuator a</u>			
FACILITY INTERFACE N/A			
GTHER INTERFACING GSE N/A			
MOBILITY REQUIREMENTS <u>Carry near equi</u>	pment		
OPERATIONAL MODE: LOCAL x REMO	TEBOTHDETAILS	s	
200			
SOFTWARE REQUIREMENTS N/A			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		
NEW □ EXISTING □	FUNCTION BLOCK NO.	QUAN	ITITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS			L
Used for engine actuator		 	
maintenance		ļ	
		 	
			-
		-	ļ
	TOTAL REQUIRED	 	2
<u> </u>	1 I VIAL RECORDED		<u> </u>

NAME Alignment Kit	<u> </u>	TEM NO	P-0	08
REQUIREMENT SUMMARY Tug - S/C,				
Package - Tug Alignment		_		
			-	
ITEM DESCRIPTION The alignment kit	consists of optical target	s, clinom	eters,	
attachment hardware, measuring	g equipment and associated	optical		
instruments and fixtures to a	lign payload elements.			<u>,</u>
				
				<u> </u>
				
DIMENSIONS (FT)LW	H POWER N/A V H	z θ		KW
WEIGHT (LBS)FLUID REQUIR				
ARTICLE OR ASSEMBLY SUPPORTED Tug, k	ick stage, S/C and deployme	nt adapte	r	
VEHICLE INTERFACE <u>Alignment fixture</u>	attachment points			
FACILITY INTERFACE N/A				
OTHER INTERFACING GSE N/A				
MOBILITY REQUIREMENTS N/A				
OPERATIONAL MODE: LOCAL x REI	MOTEBOTH	DETAILS	S	 -
N/A				-
SOFTWARE REQUIREMENTS N/A				
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:	···		
NEW EXISTING	FUNCTION ELOCK NO.		QUAN	VTITY
MODIFIED COMMERCIAL			WTR	ETR
REMARKS	4.18, 5.1			2
		<u> </u>		
			<u> </u>	
	TOTAL REQUIRED			2

NAME Insulation Purge and Meter	ing Unit	ITEM NO	p-009
REQUIREMENT SUMMARY Supply an			
ITEM DESCRIPTION Portable unit th	at connects to faci	lity gas (H _e) suj	pply and
provides a regulated flow	to the purge bag.	Provide measuring	g device to
measure the efficient gas	flow from the purge	bag and determin	ne the
moisture content of the ef	fluent.		
DIMENSIONS (FT) 5 L 3 W			
WEIGHT (LBS)FLUID RE	QUIREMENTS <u>CHe</u>	PS1G	QUAN
ARTICLE OR ASSEMBLY SUPPORTED			
VEHICLE INTERFACE Purge Bag In			
FACILITY INTERFACE He Supply			
OTHER INTERFACING GSE			
MOBILITY REQUIREMENTSPortable=W			
OPERATIONAL MODE: LOCAL x	_ REMOTE B	OTHDE	TAILS
SOFTWARE REQUIREMENTS N/A			
EQUIPMENT SOURCE:	EQUIPMENT AL	LOCATION:	
NEW EXISTING	FUNCTION BLO		QUANTITY
MODIFIED COMMERCIAL			WTR EYR
REMARKS			-
TEMATICS	4.6, 5.12	, 6.7.	1 2
·			
	TOTAL REQUIR	RED	1 2

NAME Propellant Supply and Transfer U	nitITEM NO. P-0	10	
REQUIREMENT SUMMARY Provide portable LH2 and LO2 capability for fuel cell			
checkout.			
ITEM DESCRIPTION The supply and transfer	set consists of LH, and LO, dewar	s,	
	liner, adapter and a facility vent		•
DIMENSIONS (FT) L W H	POWER 110 V 60 Hz 1 0		KW
WEIGHT (LBS)FLUID REQUIREM			
40 lbs LH,, 40 lbs LO,	£, £		
ARTICLE OR ASSEMBLY SUPPORTED <u>Fuel Cel</u>	1 Checkout		
VEHICLE INTERFACE N/A			
FACILITY INTERFACE <u>Utility Power Recept</u>	able, LH, Vent, LO, Vent		
OTHER INTERFACING GSE N/A			
		•	
MOBILITY REQUIREMENTS Portable Cart			
OPERATIONAL MODE: LOCAL X REMOT	TEBOTHDETAILS		
SOFTWARE REQUIREMENTS			
	~		
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		_
NEW DEXISTING D	FUNCTION BLOCK NO.	QUAN	ITITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS			Ļ
Used for fuel cell refurbishment			
and off-line checkout			
	TOTAL REQUIRED		2

NAME APS Propellant Control Set	ITEM NOP-	011	
	EQUIREMENT SUMMARY Support APS Leak and Functional Checks and Purge Operations		
ITEM DESCRIPTION This unit is used to p	perform APS propellant and pressur	izatio	n
	. It will provide regulated pres		
	eck the system, and regulated power		
	nins valves, regulators, gages, in		
	ng, regulating and control equipme		
DIMENSIONS (FT) L W H	POWER 110 V 60 Hz 1	θ	кw
WEIGHT (LBS)FLUID REQUIREN	MENTS GN PSIG 500 O	UAN	
ARTICLE OR ASSEMBLY SUPPORTED APS fli	ight system		
VEHICLE INTERFACE APS pressurization	n umbilical		
FACILITY INTERFACE Facility power, fa	ecility gas		
OTHER INTERFACING GSE LPS, E-001			
Von From TDF	intenance and checkout area to		
MOVE FROM IFF mail MOBILITY REQUIREMENTS storable propells	ant loading area		
OPERATIONAL MODE: LOCAL x REMO	TEBOTHDETAIL	_S	
		· · · · · · · · · · · · · · · · · · ·	
SOFTWARE REQUIREMENTSN/A	M18.44		
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		
NEW EXISTING	FUNCTION BLOCK NO.		NTITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS	1.6, 2.1, 2.11, 4.6,	-	ļ
	4.41, 4.42, 5.10, 5.11	1 1	2_
		-	
			<u> </u>
			<u> </u>
	TOTAL REQUIRED	\perp _1	1 2

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NAME APS Propellant Supply and Tra	ansfer Unit	ITEM NO. P	-012	
REQUIREMENT SUMMARY <u>Unload and</u>		-		· · · · · · · · · · · · · · · · · · ·
				i
ITEM DESCRIPTION This unit is used t		•		rage
tank. The unit contains pump, va			nerol	
acvises.				
				_
			· ,	
DIMENSIONS (ST)	H DOWER 220	V 60 Hr 2	Δ	tc)Ai
DIMENSIONS (FT) L W W FLUID REQUI				
WEIGHT (EBS)			10AN,	
ARTICLE OR ASSEMBLY SUPPORTED APS				
VEHICLE INTERFACE APS fill and drai	in line umbilical,	electrical umbili	cal	
FACILITY INTERFACE Facility pressur	e, facility power			
OTHER INTERFACING GSE LPS, E-001				
MOBILITY REQUIREMENTS Over the ro				
OPERATIONAL MODE: LOCALRE	:MOTE BO	H_XDETAIL	LS	
SOFTWARE REQUIREMENTS N/A				
EQUIPMENT SOURCE:	EQUIPMENT ALLO			
NEW EXISTING	FUNCTION BLOCK	CNO.		VTITY
MODIFIED COMMERCIAL			WTR	ETR
REMARKS			-	
Contingency, unloading of APS			-	
hydrazine				
		······································		
			1	
			+	
			1	
	TOTAL REQUIRED)	1	2

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NAME Preservation Kit	ITEM NO. P-1	013	
REQUIREMENT SUMMARY Permit free breath	ARY Permit free breathing of Tug APS propellant tanks during		
shipment and storage.			
ITEM DESCRIPTION The preservation kit o	consists of nozzle closures, inter	face	
fittings, desiccants and hydrazi	ne absorber.		
DIMENSIONS (FT) L W H	POWER N/A V Hz $ heta$		кw
WEIGHT (LBS)FLUID REQUIREM	ENTS N/A PSIG QU	AN	
ARTICLE OR ASSEMBLY SUPPORTED APS prop	pellant tanks		
VEHICLE INTERFACE <u>APS fill and drain</u>	lines		
FACILITY INTERFACE N/A			
OTHER INTERFACING GSE N/A			
MOBILITY REQUIREMENTS N/A			
OPERATIONAL MODE: LOCAL X REMOT		,	
SOFTWARE REQUIREMENTSN/A			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		
NEW EXISTING	FUNCTION BLOCK NO.	QUAN	\TITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS			
Used during shipment and storage			
		ļ — —	
		 -	
			
	TOTAL OFFICE PROPERTY.		
	TOTAL REQUIRED	j .	2

NAME Vacuum Pump and Guge Unit ITEM NO. P-014
REQUIREMENT SUMMARY Provide vacuum source for instrumentation test and
checkout and for evacuating vacuum insulated cryogenic lines.
ITEM DESCRIPTION The unit con ists of a vacuum pump, associated valves and
piping, a sensor and associated electronics.
DIMENSIONS (FT) L W H POWER 220 V 60 Hz 3 0 KV
WEIGHT (LBS)FLUID REQUIREMENTSPSIGQUAN
ARTICLE OR ASSEMBLY SUPPORTED Propulsion fill lines
VEHICLE INTERFACE Vacuum jacketed lines
FACILITY INTERFACE Facility power
OTHER INTERFACING GSE
·
MOBILITY REQUIREMENTS Portable cart
OPERATIONAL MODE: LOCAL X REMOTE BOTH DETAILS
SOFTWARE REQUIREMENTS
EQUIPMENT SOURCE: EQUIPMENT ALLOCATION:
NEW ☐ EXISTING ☐ FUNCTION BLOCK NO. QUANTITY
MODIFIED COMMERCIAL WTR ETR
REMARKS 2.12 2
TOTAL REQUIRED 2

NAME Hydraulic Servicer		ITEM NOF	-015	
REQUIREMENT SUMMARY Service	hydraulic system			····
control valves, relie	er contains a hydraulic pump, ref valves, gauges, filters, hose e connectors.	es, and assoc	iated	
	W H POWER 220 V 60 D REQUIREMENTS Hyd fluid F			_
VEHICLE INTERFACE hydr FACILITY INTERFACE faci	hydraulic system aulic system lity power			
MOBILITY REQUIREMENTS N/A	REMOTE BOTH		s	
SOFTWARE REQUIREMENTS				
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION	J:		
NEW	FUNCTION BLOCK NO.		QUAN	ITITY
REMARKS			····	- ' ' '
Used for hydraulic system			 	
servicing required		777	1	
DOLYTOMB LOGORAGE				
	TOTAL BEOLUBED		 	
	TOTAL REQUIRED		<u> </u>	2

NAME Pressurization Control Set	ITEM NO	-016	
REQUIREMENT SUMMARY Provide, measur			
TRANSPORTER THE WAY A PROMISE TO A			<u> </u>
ITEM DESCRIPTION This unit provides t	to perform leak and functional chec		1
	in propellant/main propulsion system		
	llators, gages, interconnecting plum		
power_conditioning/regulation	and control.		
			
DIMENSIONS (FT)LW	H POWER 110 V 60 Hz 1 6)	ΚW
WEIGHT (LBS)FLUID REQUIR			
	- 4		
ARTICLE OR ASSEMBLY SUPPORTED <u>Flight</u>	systems		
VEHICLE INTERFACE <u>Pressurization and</u>			
FACILITY INTERFACE Facility pr	ressure, facility power		
OTHER INTERFACING GSE LPS, E-001			
		·	
MOBILITY REQUIREMENTS N/A		· <u> </u>	·——
OPERATIONAL MODE: LOCA! X REM	MOTEBOTHDETAILS	S	
SOFTWARE REQUIREMENTSN/A			
301 WARE HEADTHEWEIVIS			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		
NEW EXISTING	FUNCTION BLOCK NO.	QUAN	TITY
MODIFIED COMMERCIAL		WTR	ETR
REMARKS	1.6, 1.15, 2.1, 2.2, 2.3, 2.5,	<u> </u>	
	2.11, 2.17, 2.18, 4.6, 4.7, 4.8,	<u> </u>	
	4.10, 4.16, 4.24, 5.10	1	2
		<u> </u>	-
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		<u> </u>	
	TOTAL REQUIRED	1	2

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NAME Decontamination Unit, APS	iTEM (NO. P-017
REQUIREMENT SUMMARY Decontaminate hy		
ITEM DESCRIPTION The unit contains val	ives, regulators, heaters, dec	contamination
fluid system, and associated p	plumbing and control system to	purge
and decontaminate contaminated	d systems in-place on the Tug	to a safe
level.		
DIMENSIONS (FT) L W 1	H POWER N/A V Hz	θ κw
WEIGHT (LBS)FLUID REQUIRE	MENTS GN PSIG PSIG	QUAN
ARTICLE OR ASSEMBLY SUPPORTED APS		
VEHICLE INTERFACE APS fill, drain and		
FACILITY INTERFACE Facility power, G		
OTHER INTERFACING GSE		
MOBILITY REQUIREMENTS Portable unit		
OPERATIONAL MODE: LOCAL X REMO	OTEBOTHE	JETAILS
N/A		
SOFTWARE REQUIREMENTS N/A		
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:	
NEW □ EXISTING □	FUNCTION BLOCK NO.	QUANTITY
MODIFIED COMMERCIAL		WTR ETR
REMARKS		
Used for maintenance of APS		
components		
	TOTAL REQUIRED	2

NAME Vacuum Pump and Gauge Unit - APS	SITEM NO	018	
REQUIREMENT SUMMARY Provide vacuum so			
line prior to loading.			
ITEM DESCRIPTION The unit consists of	a vacuum pump, associated valves		
and piping, a sensor and associa	ated electronics.	·· · · · · · · · · · · · · · · · · · ·	
	•		
		<u></u>	
		·	
DIMENSIONS (FT) L W H			
WEIGHT (LB\$)FLUID REQUIREME	ENTSPSIGQU	AN	
ARTICLE OR ASSEMBLY SUPPORTED APS su	_		
VEHICLE INTERFACEAPS lines			
FACILITY INTERFACE Facility power			
OTHER INTERFACING GSE			
MOBILITY REQUIREMENTS N/A			
OPERATIONAL MODE: LOCAL x REMOT			
OPERATIONAL MODE: LOCAL NEMOT	50 m		
SOFTWARE REQUIREMENTS			
SOFTWARE REGULATION TO THE SOFTWARE REGULATION T			
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:		•••
NEW [] EXISTING [FUNCTION BLOCK NO.	QUAN	JTITY :
MODIFIED COMMERCIAL		WTR	ETR
REMARKS	5.11	1	2
	TOTAL REGUIRED	1	2

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以是一句话,如果一句话,也是一句话,也是一句话,也是一句话,也是一句话,也是一句话,也是一句话,也是一句话,也是一句话,也是一句话,也是一句话,也是一句话,也是 第二章 话,一句话,一句话,也是一句话,也是一句话,也是一句话,也是一句话,也是一句话,也是一句话,也是一句话,也是一句话,也是一句话,也是一句话,也是一句话,

NAME Thermal Control Servicing Set	ITEM NO	P-019
REQUIREMENT SUMMARY Service active '		
ITEM DESCRIPTION The servicer contain	s a pump, reservoir control val	ves, relief
valves, gauges, filter, hoses and asse	ociated plumbing and interface	connectors.
		^
DIMENSIONS (FT) L W STAND DECLUSE		
WEIGHT (LBS)FLUID REQUIRE	EMEN 15PSIG	QUAN
ARTICLE OR ASSEMBLY SUPPORTED Active	thermal control system	
VEHICLE INTERFACE		
FACILITY INTERFACE <u>Facility power</u>		<u> </u>
OTHER INTERFACING GSE N/A		
MOBILITY REQUIREMENTS Portable wheel		
OPERATIONAL MODE: LOCAL X REM	OTEBOTHDE	TAILS
SOFTWARE REQUIREMENTS _ N/A		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
301 WARE RECOMENENTS		
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:	
NEW [] EXISTING []	FUNCTION BLOCK NO.	QUANTITY
MODIFIED COMMERCIAL		WTR ETR
REMARKS	2.12	2
·		

NAME Hot GN Purge Unit	ITEM I	NO. <u>P-020</u>
REQUIREMENT SUMMARY Supply hot CY for	or MLI purging	
ITEM DESCRIPTION Portable unit that pro-	vides a regulated flow to the	purge bag.
Provide measuring device to measure the	e gas flow from the purge bag	g and
determine moisture content. Provide h	eater capability to heat N ₂ t	:o 580 ⁰ F
(120°F)	As to be the second of the sec	
		· · · · · · · · · · · · · · · · · · ·
DIMENSIONS (FT) L W H	POWER 220 V 60 Hz 3	θ κν
WEIGHT (LBS)FLUID REQUIREN	MENTS GN PSIG PSIG	QUAN
	_	
ARTICLE OR ASSEMBLY SUPPORTED Tug purge		
VEHICLE INTERFACE <u>Purge bag inlet</u> FACILITY INTERFACE <u>GN_ supply</u>		100 10 Vince
OTHER INTERFACING GSE		
MOBILITY REQUIREMENTSPortable wheel r	nounted	
OPERATIONAL MODE: LOCAL REMO	TEBOTHD	ETAILS
COSTUARE DEGLUCION N/A	***	
SOFTWARE REQUIREMENTSN/A		
EQUIPMENT SOURCE:	EQUIPMENT ALLOCATION:	
NEW ☐ EXISTING □	FUNCTION BLOCK NO.	QUANTITY
MODIFIED COMMERCIAL		WTR ETR
REMARKS	4.23	2
	TOTAL REQUIRED	2

NAME <u>Ultrasonic Scan Uni</u>	t	ITEM	NOS-001
REQUIREMENT SUMMARY Insp			
ITEM DESCRIPTION Low frequen			
and logic for analy	ses of harmonic and/o	r frequency displa	у.
DIMENSIONS (FT)L			
WEIGHT (LBS)FL	JID REQUIREMENTS	PSIG	QUAN
ARTICLE OR ASSEMBLY SUPPORTED	Tug structure	· · · · · · · · · · · · · · · · · · ·	
VEHICLE INTERFACE Surface			
FACILITY INTERFACE			
OTHER INTERFACING GSE			
MOBILITY REQUIREMENTS Po	rtable		
OPERATIONAL MODE: LOCAL	K REMOTE	ВОТНС	DETAILS
SOFTWARE REQUIREMENTS			
EQUIPMENT SOURCE:	EQUIPMEN'	T ALLOCATION:	·
NEW EXISTING	FUNCTION	BLOCK NO.	QUANTITY
MODIFIED COMMERCIAL			WTR ETR
REMARKS	2.12		2
	F		
	TOTAL REC	DUIRED	2

NAMERadiography UnitITEM NO5	5-002	
REQUIREMENT SUMMARY Examination of Tug structure for internal flo		
discontinuities, cracks, and failures		
ITEM DESCRIPTION		··-
		·
	-	
DIMENSIONS (FT) L W H POWER 220 V 60 Hz $oldsymbol{ heta}$		KW
WEIGHT (LBS)FLUID REQUIREMENTSN/APSIGQU	AN	
ARTICLE OR ASSEMBLY SUPPORTED Tug structure VEHICLE INTERFACE Surface of all structure to be examined		
OTHER INTERFACING GSE		
57 TEN AVIEW ACTION COSE	•	
MOBILITY REQUIREMENTS		
OPERATIONAL MODE: LOCAL REMOTE BOTH DETAILS		
SOFTWARE REQUIREMENTS		
EQUIPMENT SOURCE: EQUIPMENT ALLOCATION:		
NEW EXISTING FUNCTION BLOCK NO.	QUAN	
MODIFIED COMMERCIAL	WTR	ETR
REMARKS 2.12	** 1 1 1	2
612		
	-	
TOTAL REQUIRED		2

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The Tug Facility Requirements Specification Data Sheet is prepared to provide requirements data for launch site operational facility planning. This data will provide the basic information from which decisions can be made to utilize existing facilities, modify existing facilities, or build new facilities to support Tug activities. This sheet identifies the facility, the launch site, the functions performed in the facility, and the functional flow block number as follows:

FACILITY: Identifying name of the facility or major area at the launch site.

LOCATION: Identification of a specific area, i.e., airlock, checkout, propellant loading, etc., required within the facility identified above.

FUNCTION: Description of the activities performed in the facility during major blocks of Tug turn-around activities in the different locations.

FUNCTION BLOCK NO.: A cross reference to the Space Tug Functional Flow Diagram block numbers † applicable to the particular location identified.

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CHARACTERISTICS: Identification and definition of Tug and/or
Tug/GSE footprint requirements, ceiling height requirements,
cleanliness level requirements, security requirements, requirement
for LPS station/interfaces, and any commodities/consumables
required.

^{*}Based on the functions defined in the Tug Functional Flow Diagram, subplan A, Volume II, Part I and the Tug Function Description Data Sheets in Appendix A.

[†]Reference: subplan A, Volume II, Part I.

REQUIREMENTS/DESCRIPTION: A narrative description of facility requirements including door width, height, hook height, bridge crane capacity, test area support requirements, special ventilation requirements, etc.

FACILITY: Orbiter Processing Facility	Transfer Aisle
FUNCTION:	FUNCTION BLOCK NO:
Remove payload from orbiter	
	1.1
CHARACTERISTICS:	
FLOOR 150 Et L 60 Et W 9000 SQ. FT.	63 ft CEILING HEIGHT
	·
CLEANLINESS LEVEL REQUIREDN/ASECURITY	REQUIRED As required by S/C
LIBSTERMINAL DECLUBED WEST NO ES COMMODI	TIES N/A
LPS TERMINAL REQUIRED YES NO 50 COMMODI	
REQUIREMENTS/DESCRIPTION 1. Access Door: Clear width 25 ft, clear height	25 St
1. Access Mot. Clear Width 15 It. Clear height	27 11.
2. Overhead bridge crane: 8 ton minimum capacity	y, minimum hook height 53 ft. above
61 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	O fe givele anna life with
floor, minimum horizontal travel 90 ft. by 9	U it. Single speed lift with
inching capability at any position.	
Inditing capability at any position.	
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	a a primara de de la composição de la composição de destructura de la composição de la composi de la composição de la composição de la composição de la composi
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FACILITY: Orbiter Processing Facility	LOCATION: Tug Demate Area	
FUNCTION: Demate Tug/Spacecraft, remove COMSEC	FUNCTION BLOCK NO:	
equipment	1.2, 1.3	
CHARACTERISTICS: FLOOR 100 L 60 W 6000 SQ. FT. 4	O CEILING HEIGHT	
	EQUIRED as required by S/C	
LPS TERMINAL REQUIRED YES NO C COMMODITIE	ES Facility power	
REQUIREMENTS/DESCRIPTION 1. Access door: Clear width - 25 ft., clear he	ight - 25 ft.	
2. Overhead Bridge Crane: 5-ton minimum capacit	y, minimum hook height	
28 ft above floor, single speed lift with in	ching capability in any	
position.		
·		

FACILITY:	LOCATION:	
Tug Processing Facility	Airlock	
FUNCTION:	FUNCTION BLOCK NO:	
Receive inspect, clean, damage inspection, Tug	<u> </u>	
safing.	1.4 - 1.7, 1.13, 1.14, 1.15,	
	2.1 - 2.9, 2.13, 2.14.	
	4.3 - 4.11, 4.31 - 4.36	
CHARACTERISTICS:		
FLOOR 70 ft L 50 ft W 3500 SQ. FT. 95	<u>ft</u> ceiling height	
CLEANLINESS LEVEL REQUIRED N/A SECURITY R	REQUIRED N/A	
LPS TERMINAL REQUIRED YES ☑ NO □ COMMODITI	ES <u>Utility power receptable</u>	
GN	l ₂ , H _e , Cleaning Chemical	
REQUIREMENTS/DESCRIPTION 1. Access Door: Clear width 25 ft., clear height	ght 85 ft.	
2. Overhead bridge crane: 8 ton minimum capacit	***	
above floor, minimum horizontal trave TBD.		
	orner open Tite with Indian	
capability at any position.		
3. Purge and vent; a. H ₂ - 3 inch vent line to		
He purge supply; b. O ₂ - 3 inch vent line to remote GOX safe area; GN ₂ purge		
supply; c. Hydrazine - 3 inch vent line to remote hydrazine safe area; GN ₂		
purge supply.		
4. Personnel safety and hazardous area requirements: a. Hazard gas detection		
system; b. Fire protection and standby equip	oment; c. Safety shower;	
d. Static electricity bonding and grounding set; e. Positive ventilation		
system; f. Lightning protection; g. Emergency egress.		
The state of the s	-1-924.2991	
ARRIVE SERVICE		

FACILITY: Tug Processing Facility	LOCATION: Tug Maintenance and Checkout Area	
FUNCTION:	FUNCTION BLOCK NO:	
Tug refurbish, checkout, and buildup for		
mission. Mate spacecraft to Tug and checkout.	2.10, 2.11, 2.12, 3.1, 4.12,	
	4.13, 4.16 - 4.29, 5.1 - 5.9,	
	5.13, 5.21	
CHARACTERISTICS:		
FLOOR 35 ft L 35 ft W 1325 SQ. FT. 95	ftCEILING HEIGHT	
CLEANLINESS LEVEL REQUIREDSECURITY R	EQUIRED as required by S/C	
LPS TERMINAL REQUIRED YES 1 NO C COMMODITIE	ES <u>Utility power receptacle for</u>	
C/O enqupment 120V 60 Hz Single Phase, 5 KVA; GHo	, GN ₂ , Utility Compressed Air,	
Cooling Air for Tug electronics		
REQUIREMENTS/DESCRIPTION		
1. Overhead crane: 8 ton minimum capacity, minim	um hook height 85 ft above	
floor, minimum horizontal travel TBD, single	speed lift with inching	
capability at any position.		
2. Ols Communications		
3. Two bays required		
4. Parasitic Antenna		
5. Tempest compatible		
6. Propellant vent lines, pneumatic supply, drains, washdown hoses,		
eye washes.		

FACILITY:	LOCATION: Deployment Adapter Maintenance and Checkout Area
Tug Processing Facility FUNCTION:	FUNCTION BLOCK NO:
Deployment adapter refurbish and checkout in	T diversion bedock no.
preparation for mate with Tug	2.15, 2.16, 2.17, 3.2, 4.14,
	4.15
CHARACTERISTICS: FLOOR 75 ft L 70 ft W 5250 SQ. FT.	30 ft CEILING HEIGHT
CLEANLINESS LEVEL REQUIRED 100K SECURITY	REQUIRED N/A
LPS TERMINAL REQUIRED YES ED NO COMMODI	TIES Utility power receptacles
GH _e , GN ₂ , utility compressed air.	
REQUIREMENTS/DFSCRIPTION 1. Overhead crane - TPF crane	
2. OIS communications	
3 The house required	

FACILITY: Tug Processing Facility	LOCATION: Kick Stage Build-up and Checkout Area
FUNCTION: <u>Kick stage build-up</u> and checkout in prep	FUNCTION BLOCK NO:
for mate with Tug.	4.37 - 4.48
CHARACTERISTICS: FLOOR 40 ft L 35 ft W 1400	SO. FT. 30 ft CEILING HEIGHT
CLEANLINESS LEVEL REQUIRED100K	SECURITY REQUIRED N/A
LPS TERMINAL REQUIRED YES & NO []	COMMODITIES <u>Utility Power Receptacle</u> ,
GH _e , GN ₂ , Utility Compressed Air	
REQUIREMENTS/DESCRIPTION 1. Overhead crane - TPF Crane	
2. OIS Communications	
V.J. Minuteritary Italia	

FACILITY: Tug Processing Facility	LOCATION: Storable Propellant Loading Area
FUNCTION: Load Tug APS Propellants and Partial	FUNCTION BLOCK NO:
Pressurant Load	5.10, 5.11, 5.12
CHARACTERISTICS:	
FLOOR 25 ft L 25 ft W 625	SQ. FT. 95 ft. CEILING HEIGHT
CLEANLINESS LEVEL REQUIRED 100K S	ECURITY REQUIRED as required by S/C
LPS TERMINAL REQUIRED YES NO COMMODITIES 350 1bs hydrazine, GHe.	
ntility power receptable, GN _Z	
REQUIREMENTS/DESCRIPTION	
1. Access door: clear width 25 ft, cl	ear height 85 ft.
2. Personnel safety and hazard area re	quirements: a. hazard gas detection
system; b. fire protection and stand	dby equipment; c. safety shower;
d. static electricity bonding and g	rounding set; e. positive ventilation
system; f. lightning protection; g.	emergency egress.
3. OIS communications.	
	91 Table Mills Children and the company of the comp

FACILITY: Spacecraft Processing Facility	LOCATION: Storable Propellant Loading Area	
FUNCTION:	FUNCTION BLOCK NO:	
Load Tug APS propellants and partial pressurant		
load.	5.10, 5.11, 5.12	
CHARACTERISTICS:		
FLOOR 25 ft L 25 ft W 625 SQ. FT. 95 f	CEILING HEIGHT	
CLEANLINESS LEVEL REQUIRED 100K SECURITY RE-	OUIRED as required by S/C	
LPS TERMINAL REQUIRED YES NO COMMODITIES 350 lbs hydrazine, GHg.		
utility power receptable, GNo		
REQUIREMENTS/DESCRIPTION 1. Access door: clear width 25 ft, clear height	85 ft.	
2. Personnel safety and hazard area requirements		
system; b. fire protection and standby equipm	ent; c. safety shower;	
d. static electricity bonding and grounding s	et; e. positive ventilation	
system; f. lightning protection; g. emergency egress.		
3. OIS communications		
	L. C.	

FACILITY:	LOCATION:
Tug Processing Facility	Tug Adapter Storage Area
FUNCTION:	FUNCTION BLOCK NO:
Store Tug and Adapter until required for mission	
	27.44
	N/A
CHARACTERISTICS: FLOOR 45 ft L 80 ft W 3600 SQ. FT. 50	ft osu we useum
FLOUR 45 IL L 00 IL W 5000 SU.FI. 50	CEILING HEIGHT
N/A	N/A
CLEANLINESS LEVEL REQUIRED N/A SECURITY RE	GOIRED
	NI/A
LPS TERMINAL REQUIRED YES NO NO COMMODITIE	SN/A
N.	
REQUIREMENTS/DESCRIPTION	
1. Access Door: clear width 25 ft, clear height	to accent bridge crane.
2. Overhead crane - TPF crane	
Z. Overnead Crane - trr Crane	
0	
3. Storage for four Tugs	
4. Storage for two adapters	
e e e e e e e e e e e e e e e e e e e	
Temperature and humidity controlled	

FACILITY: Tug Processing Facility	LOCATION:Tug Hardware
ing frocessing facility	Brided Storage Area FUNCTION BLOCK NO:
FUNCTION: Store Tug System hardware until required to	PONCTION BLOCK NO.
complete refurbish.	N/A
CHARACTERISTICS: FLOOR 100 ft L 60 ft W 6000 SQ. FT.	20 ft CEUING BEIGHT
CLEANLINESS LEVEL REQUIRED 100K SECURITY	REQUIRED N/A
LPS TERMINAL REQUIRED YES NO 183 COMMODIT	TIES <u>N/A</u>
REQUIREMENTS/DESCRIPTION 1. Access door: clear width 10 ft, clear heigh	
2. Storage rack, bins, shelves for Tug Compone	ents
	·
	1.0 - 1.0
	W W W W W W W W

FACILITY: Tug Processing Facility	LOCATION: Engine Prep and Service Area
FUNCTION: Major Engine Overhaul and Refurbishment Area	FUNCTION BLOCK NO:
	N/A
·	
CHARACTERISTICS: FLOOR 60 ft L 50 ft W 3000 SQ. FT. 20) ftCEILING HEIGHT
CLEANLINESS LEVEL REQUIRED100KSECURITY	REQUIRED N/A
LPS TERMINAL REQUIRED YES WO II COMMODIT	TES Cleaning fluid, GN ₂ ,
utility power receptacle, utility compressed air	GHe, utility power for
overhead crane. REQUIREMENTS/DESCRIPTION	
1. Access door: clear width 10 ft, clear heigh	it 20 ft.
2. Overhead crane: 1 ton capacity: 16 ft. hook	height.
, , , , , , , , , , , , , , , , , , , ,	P-
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FACILITY:	LOCATION: Battery/Fuel Cell
Tug Processing Facility	Prep and Service Area
FUNCTION: Battery/fuel cell preparation and refurbish area	FUNCTION BLOCK NO:
Particly) Idel Coax preparation the league to the	
	N/A
CHARACTERISTICS:	
FLOOR 60 ft L 20 ft W 1200 SQ. FT. 8	ft CEILING HEIGHT
CLEANLINESS LEVEL REQUIRED 100K SECURITY RE	EQUIRED N/A
LPS TERMINAL REQUIRED YES IN NO COMMODITIE	S GH _e , GO ₂ , GN ₂ ,
utility power receptacle.	
	.• -
REQUIREMENTS/DESCRIPTION 1. Vent - H ₂ - 3 inch vent line to remote burnof	f unit or pond;
0 - 3 inch vent line to GOX safe area.	

FACILITY:	LOCATION: GSE Checkout
Tug Processing Facility	and maintenance area
FUNCTION: Periodic calibration and maintenance of	GSE FUNCTION BLOCK NO:
	N/A
CHARACTERISTICS:	
FLOOR 60 ft L 40 ft W 2400	SQ. FT. 10 ft CEILING HEIGHT
CLEANLINESS LEVEL REQUIRED 100K	SECURITY REQUIRED N/A
LPS TERMINAL REQUIRED YES □ NO 図	COMMODITIES Utility power receptacles,
GH _e , GO ₂ , GN ₂ , utility compressed air.	
REQUIREMENTS/DESCRIPTION 1. Bench calibration areas.	i i i i i i i i i i i i i i i i i i i

FACILITY: Tug Processing Facility	LOCATION: Avionics Checkout and Maintenance Area
FUNCTION: Avionics refurbishment and checkout	FUNCTION BLOCK NO:
	n/A
CHARACTERISTICS: FLOOR 60 ft L 50 ft W 3000 SQ. FT. 10	ft CEILING HEIGHT
CLEANLINESS LEVEL REQUIRED 100K SECURITY R	REQUIRED N/A
LPS TERMINAL REQUIRED YES NO D COMMODITI	ES_Utility power receptable
REQUIREMENTS/DESCRIPTION 1. Stable platform for avionics optical alignmer	nt
2. Bench area for LRU refurbishment	
	And the second s
	The second secon

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FACILITY:	LOCATION:
Tug Processing Facility	Paint Shop
FUNCTION:	FUNCTION BLOCK NO:
Refurbish Tug LRU's/Segments	
	N/A
CMARACTERISTICS: FLOOR 60 ft L 40 ft W 2400	SO, FT. 28 ft CEILING HEIGHT
CLEANLINESS LEVEL REQUIRED	SECURITY REQUIRED N/A
	COMMODITIES Utility compressed air.
LPS TERMINAL REQUIRED YES [] NO 🔞	·
	Paint.
REQUIREMENTS/DESCRIPTION Access door: clearance width 25	ft, clearance height 25 ft.
A. IECOS GOOT, Clearance wittin 25	TO OTHER MICE HOLDING CO. A.D.
2. Blowers to evacuate paint vapor/	fumes from area.
· · · · · · · · · · · · · · · · · · ·	
	Market 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1
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FACILITY:	LOCATION:
Spacecraft Processing Facility	Canister Loading Area
FUNCTION:	FUNCTION BLOCK NO:
Load Payload into Transport Canister	
	5.17
	5.17
CHARACTERISTICS:	25 6.
FLOOR 50 ft L 25 ft W 1250	SQ. FT. 95_it CEILING HEIGHT
CLEANLINESS LEVEL REQUIRED100K	SECURITY REQUIRED as required by S/C
CLEANLINESS LEVEL REQUIRED	SECORITY RECOINED as required by bio
LPS TERMINAL REQUIRED YES [] NO 83	COMMODITIESN/A
ICLO LEMMINATE MEGOLIFES 152 F. MO P.	
REQUIREMENTS/DESCRIPTION	
1. Overhead crane: 8 ton minimum capa	city minimum book height 85 ft.
**************************************	ZALJE MENTINGH HVXN NSON XX 255
above floor, Single speed lift wi	th inching capability at any position.
2. OIS communications	
3. Airlock to canister door seal	
J. Alliock to cantocal door bada	
	The transfer of the transfer o

FACILITY:	LOCATION:
Tug Processing Facility	Canister Loading Area
FUNCTION:	FUNCTION BLOCK NO:
Load Payload into Transport Canister	
	5.17
	1
CHARACTERISTICS:	
FLOOR <u>50 ft L 25 ft W 1250</u> SQ. FT. <u>95 f</u>	tCEILING HEIGHT
1000	
CLEANLINESS LEVEL REQUIRED 100K SECURITY R	EQUIRED as required by S/C
COMMODITO	SN/A
LPS TERMINAL REQUIRED YES INO B COMMODITIE	5 N/A
	· · · · · · · · · · · · · · · · · · ·
REQUIREMENTS/DESCRIPTION	
1. Overhead crane: 8 ton minimum capacity, min	imum hook height 85 ft. above
floor. Single speed lift with inching capab	ility at any position.
2. OIS communications	
3. Airlock to canister door seal	
J. ATTIOCK to carriet door sear	
	·

FACILITY:	LOCATION:
Hanger (TBD)	Canister Storage Area
FUNCTION:	SUNCTION BLOCK NO:
Store canister until required for Tug	
transportation	N/A
CHARACTERISTICS:	
FLOOR <u>80 ft</u> L <u>60 ft</u> W <u>4800</u> SQ. FT. <u>30</u>	ft CEILING HEIGHT
CLEANLINESS LEVEL REQUIRED N/A SECURITY RE	QUIRED N/A
LPS TERMINAL REQUIRED YES NO E COMMODITIES	S <u>N/A</u>
·	
REQUIREMENTS/DESCRIPTION 1. Provide storage area for three canisters.	
1. Provide storage area for three canisters.	
	·

FACILITY: Spacecraft Processing Facility	LOCATION: Tug/Spacecraft Mating Area
FUNCTION: Mate spacecraft to Tug and checkout in preparat-	FUNCTION BLOCK NO:
ion for mission	5.2 - 5.8, 5.15, 5.21
CHARACTERISTICS: FLOOR 80 ft L 25 ft W 2000 SQ, FT. 95	ft CEILING HEIGHT
CLEANLINESS LEVEL REQUIRED 100K SECURITY RE	OUIRED as required by spacecraft
LPS TERMINAL REQUIRED YES ☑ NO ☐ COMMODITIE	S Utility power receptacle
REQUIREMENTS/DESCRIPTION 1. Access door: clear width 25 ft, clear height	85 ft
 Overhead crane: 8 ton minimum capacity, sing 	
capability at any position.	
3. Parasitic antenna	
4. OIS communication	
5. Tempest compatible	
6. Class 100,000 inlet air	
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FACILITY: Launch Complex	LOCATION: Payload Changeout Room	
FUNCTION:	FUNCTION BLOCK NO:	
Payload transfer (canister to PCR), buildup, and	TONOTION BESSIA NO.	
checkout, transfer (PCR to orbiter bay)	5.2, 5.4, 5.5, 5.6, 5.8, 5.19,	
	5.20, 5.21, 6.3 - 6.10, 7.1,	
	7.2, 7.3	
CHARACTERISTICS: FLOOR 50 ft L 50 ft W 2500 SQ. FT. 80	ftCEILING HEIGHT	
CLEANLINESS LEVEL REQUIRED 100K SECURITY RI	EQUIRED as required by S/C	
LPS TERMINAL REQUIRED YES NO COMMODITIE	S Cooling air for Tug	
electronics, utility power receptacle.		
REQUIREMENTS/DESCRIPTION	1007	
1. Retractable clean room to mate with orbiter bay a	ind maintain look during	
extend/retract and orbiter bay operation.		
2. OIS communications	······································	
3. Staging area at base of PCR		
4. Overhead crane: 8 ton minimum capacity, hook heig	ht 70 ft minimum, single	
speed with inching capability.		
5. Personnel and freight elevator		
6. Lightning protection		
7. Payload handling device		
a. Holding fixture for buildup and checkout of p	payload	
b. 3 degree of freedom for payload movement fro		
8. Mobile 8 ton crane		
9. Tempest compatible.		

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FACILITY:	LOCATION: LO ₂ /LH ₂ Interface Towers
Launch Complex FUNCTION:	FUNCTION BLOCK NO:
Load Tug propellants and pressurants	
	7.1, 7.2
	1013 102
CHARACTERISTICS:	
FLOOR N/A L N/A W N/A SQ. FT	N/A CEILING HEIGHT
CLEANLINESS LEVEL REQUIRED N/A SECURITY	REQUIRED N/A
LPS TERMINAL REQUIRED YES NO TO COMMODIT	ries LH ₂ , LO ₂ , GH _e
REQUIREMENTS/DESCRIPTION	
1. The following services are required via the LH	2/LO ₂ interface towers to the
payload disconnect panels on the orbiter.	
	1.5 -111-2
a. LO ₂ fill and drain (main propellant tank a	nd fuel cells)
b. LH, fill and drain (main propellant tank a	nd fuel cells)
c (H fill and went	
c. GH _e fill and vent	
d. LH ₂ tank vent	
e. LO, tank vent	
f. APS system vent	
Tr into dypocial vent	
g. Fuel cell vent	
<u> </u>	

FACILITY: Storage and Maintenance Bldg.	LOCATION: TPF
FUNCTION: Inspect, Clean Damage Inspection, Store	FUNCTION BLOCK NO:
Tug, Adapter, Sys. Hardware, Refurbish Area,	
Calibrate, Maintain GSE, Office and Crew Areas.	
CHARACTERISTICS: FLOOR 140' L 75' W 12,500 SQ. FT.	CEILING HEIGHT
CLEANLINESS LEVEL REQUIRED N/A SECURITY R	EQUIRED
LPS TERMINAL REQUIRED YES NO D COMMODITIE	ES Facility Power,
Utility Compressed Air, Overhead Crane.	
REQUIREMENTS/DESCRIPTION	
1. Access door clear width and height - 25'-0"	
2. Overhead crane: capacity (TPD) min. hoot height	(TBD), horz. or long travel (TBD)
Single speed lift with inching capability at any	position.
3. Bonded storage for Tugs, adapters and system hard	ware storage racks, bins and
shelves.	
4. Personnel safety area requirements: a) fire prot	tection and standby equipment;
b) safety shower; c) static electric bonding and	grounding set; d) positive
ventilation system; e) lightning protection; f) e	emergency exits.
5. Office equipment, personnel lockers, etc.	
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SOFTWARE REQUIREMENTS DATA SHEET

A Software Requirements Data Sheet has been prepared for each Function Description Data Sheet operation that requires software support. These sheets provide the following summary data:

FUNCTION NO: The number for the block on the Space Tug Functional Flow Diagram.*

FUNCTION TITLE: The title of the function block.

FUNCTION: Brief statement of function objective.

REQUIREMENTS/DESCRIPTION: Specific requirements requiring use or generation of ground software.

COMPUTER INTERFACE: The LPS interface with the controlled, monitored, or tested item.

INPUT DESCRIPTION: Keyed to the requirements/description section by number, this section lists all the inputs that the software needs to function in its predetermined manner.

OUTPUT DESCRIPTION: Also keyed to the requirements/description section by number, this section lists all the outputs from the computer that required software in the processing of the data or in the generation of outputs, i.e., commands, simulations, stimulations, etc.

SOFTWARE: Non-Recurring, Recurring: This section is an estimate of the operational permanence of the software. Systems that remain static in their changes will have non-recurring software. New systems, improvements, variations in payloads, changes in processing, could require new software for each test cycle.

^{*}Shown in subplan A, Volume II, Part I.

FUNCTION BLOCK NO: A cross reference to other similar software, i.e., power turn on sequences, CRT routines, etc., again keyed by number to the requirements/description.

USAGE: Applies to both WTR and ETR unless one block only is checked.

FUNCTION NO:	FUNCTIONS TITLE:			
1.2	Remove Spacecraft			
FUNCTION: Demate Spacecr	aft and Tug			
	monitoring function			!
di dana assumes	monitoring interior		·	
REQUIREMENTS/DESCI	RIPTION data dump, D/L taping, an	d erase		
	and control ground power			
(3) Compare p	arameters for safety and	initiate corrective actions		
COMPUTER INTERFACE	HIM , FEP			
INPU	T DESCRIPTION	OUTPUT DESCRIPTION		
(1) Commands,	Erasure Bits	(1) Data (mag tape), no data		
		(erasure confirm)		
(2) Manual in	<u>itiation</u>	(2) Power up and transfer seq	uenc es	······································
(3) A/B param	(3) A/B parameters (3) Sum status, exception report			
		out of limits.		
				-
	And the second s			
SOFTWARE MINON	RECURRING RECURRING	SOFTWARE ALLOCATION:		1 d d =
		FUNCTION BLOCK NO.	USA	AGE
			WTR	ETR
1		<u></u>		1

FUNCTION NO:	FUNCTIONS TITLE:			
1.5	Safe and Remove Expended Ordnanace			
FUNCTION: Safe	ordnance			
		<u>.</u>	-	
REQUIREMENTS/DESCI		against an expended state and ic	lones 6	
fired squi			IGHT I	y
	•			
	er and verify power remov	ed from initiators and ordnance i	iring	
buses.		<u>, , , , , , , , , , , , , , , , , , , </u>		
COMPUTER INTERFACE	FEP			
INPU	T DESCRIPTION	OUTPUT DESCRIPTION		
(1) A/B parame	ters	(1) Data (strip chart), (A-N CRT)	, and	
		(function panel)		
(2) Manual ini	Liation	(2) Commands (bit pattern) data		
A/B parame	ters			
				<u> </u>
				<u></u>
SOFTWARE DINON	I-RECURRING RECURRING	SOFTWARE ALLOCATION		·····
		FUNCTION PLOCK NO.	USA	AGE
			WTR	ETR
			<u> </u>	ļ
			ļ	-
			 	

FUNCTION NO:	FUNCTIONS TITLE:						
1.6	Drain and Purge APS						
FUNCTION: Control the rem	noval of all liquid from	APS					
					<u> </u>		
	DIDTION						
REQUIREMENTS/DESCI	B and GSE valves in a lo	gical	sequence				
(2) Assess APS	3 condition	<u></u>					
		-		* 10.			
COMPUTER INTERFACE							
	FEP, HIM	T	OUTPUT DECODIFIED				
INPU	T DESCRIPTION	 	OUTPUT DESCRIPTION				
(1) Manual initiation		(1) A/B commands (bit patterns) and					
Valve stat	cus	GSE commands and conditioning in					
			a logical sequence				
(2) Liquid ser	osors	(2)	Data (strip chart (trends)				
Particulat	re count	 	function panel)				
		 -					
		1					
		-					
			- Line of the second se	<u> </u>			
	_						
SOFTWARE NON	FRECURRING RECURRING	SOFT	NARE ALLOCATION:				
			TION BLOCK NO.	USAGE			
				WTR	ETR		
					ļ		
					L		

FUNCTION NO:	FUNCTIONS TITLE:	FUNCTIONS TITLE:							
1.15	Vent Pressurants to Safe Level								
FUNCTION:									
Control venting	Control venting and monitor tank pressures								
				·					
DEOLUDEMENTS/DESC	DIDTION								
REQUIREMENTS/DESCI (1) Control ai	rborne valves				···				
(2) Monitor pr	essures to safe level								
				<u></u>	·				
COMPUTER INTERFACE	IM, FEP								
INPU [*]	T DESCRIPTION		OUTPUT DESCRIPTION						
(1) Manual ini	tiation	(1)	Command generation						
		ļ	Saiety controls interlock w	ith_					
			GSE connected micro switche	s_and					
	774	+	overpressure transducers.						
(2) A/B and/or	GSE pressures (analogs)	(2)	Data (strip chart, CRT)						
		+							
		 		. 					
<u></u>		 			.,,				
SOFTWARE NON	RECURRING RECURRING	SOFT	WARE ALLOCATION:						
		FUNC	CTION BLOCK NO.	USA	AGE				
			e	WTR	ETR				

FUNCTION NO:	FUNCTIONS TITLE:						
2.1	Leak Check Pressurization System						
FUNCTION: Monitor system	Dressures						
3,000	prosoures						
	,						
REQUIREMENTS/DESC			7 1	المحمد والبارات والمالي والماليات			
	SE and A/B valves for loa	-	•				
(2) Monitor t	ank pressures				··············		
COMPUTER INTERFAC	E						
INPUT DESCRIPTION			OUTPUT DES	SCRIPTION			
(1) Manual initiation			(1) A/B commands (bit patterns)				
Valve status		GSE commands and conditioning					
			logic operations				
(2) Analogs ar	nd discretes	(2) Data (strip chart and CRT display)					
						<u> </u>	
					·		
SOFTWARE NO	N RECURRING RECURRING	SOFT	WARE ALLOCATION:				
		FUNC	TION BLOCK NO.		USA	AGE	
					WTR	ETR	
						 	
					<u> </u>	-	
					 	 	

FUNCTION NO:	FUNCTIONS TITLE:			•	
2.2	Leak Check LO2 Tank				
FUNCTION: Monitor tank pr	ressures				
					
REQUIREMENTS/DESC (1) Control as	RIPTION irborne valves for a press	suriza	ition and lockup cycle	البراهين ومسمه	ربست بسنان شا 170
ļ			pressurization and lockup cy	vcle	
(3) Monitor pr					
(4) Vent gas i	following test				
COMPUTER INTERFACE	FEB, HIM (GSE)				
INPU	T DESCRIPTION		OUTPUT DESCRIPTION		
(l) Manual ini	itiation	(1) A/B commands and logic operations			
A/B Valve	status	ļ			
(2) Same initi	iation as (1) above GSE	E (2) GSE commands and logic operations			
valve stat	cus		integrated with airborne		
(3) Analogs an	d discretes	(3)	Data (strip chart and CRT)	and	.,,
		<u></u>	compare monitoring		
(4) Same as (1)				
					
SOFTWARE IN NO	RECURRING RECURRING	SOFT	WARE ALLOCATION:	· · · · · ·	
		FUNC	TION BLOCK NO.	USA	AGE
				WTR	ETR
				<u> </u>	
}		<u> </u>		<u> </u>	-
		<u> </u>	· · · · · · · · · · · · · · · · · · ·		
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FUNCTION NO:	FUNCTIONS TITLE:				
2.3	Leak Check LH ₂ Tank				
FUNCTION: Verify LH ₂ Sy	stem Integrity - Monitor r	ressu	res		
2					· · · · · · ·
	U 10 10 - 10 - 10 - 10 - 10 - 10 - 10 -				
REQUIREMENTS/DES	CRIPTION airborne valves for a press	suriza	tion and lockup cycle		
	ncy control GSE valves for			le.	
	pressures	a pro	sserization and locally cyc	16	
(4) Vent gas	following the test				
COMPUTER INTERFA					
INP	UT DESCRIPTION		OUTPUT DESCRIPTION		
(l) Manual i	nitiation	(1)	A/B commands and logic op	eration	s
Valve sta	atus				
(2) Same inpu	ıt as (1) above	(2) GSE commands and logic operations			
			integrated with airborne		
(3) Analog ar	nd discretes for pressures	(3) Data (strip chart and CRT)			
			Compare monitoring		
(4) Same as	(1)				
	i de de la companio della companio d				~~
				· · · · · · · · · · · · · · · · · · ·	
					PO P 1-00 - 1-0 - 1-372
SOFTWARE NO	N-RECURRING RECURRING	 	NARE ALLOCATION:		
		FUNC	TION BLOCK NO.	<u> </u>	AGE
				WTR	ETR
		,			

FUNCTION NO:	FUNCTIONS TITLE:					
2.4	Service Fuel Cells and	el Cells and Reactant Leak Check				
UNCTION: Control fuel cell valves for servicing and leak checking					:	
	12 VOLVOO 101 VELVAVAND D		eas cuce orne			
REQUIREMENTS/DESCR	PIPTION		Α		والمرابع المرابع	
		valve	es to remove fuel cell moist	ıre		
(2) Control fu	el cell valves (leak chec	k)	,			
(3) Control GS	E valves, if required, to	pres	surize fuel cells	· · ·		
(4) Monitor pro		•				
	ollowing the test					
COMPUTER INTERFACE					-	
1	FEB, HIM DESCRIPTION	, ····	OUTPUT DESCRIPTION			
1101 01	- DESCRIPTION		0011010001111101			
(1) Manual initiation, F/C valve status (1) A/B and GSE commands and logic						
GSE valve s	e status operations					
(2) Manual ini	Manual initiation, F/C valve status (2) A/B valve commands and logical					
(3) Same initia	ation as (2) above	operations				
	status	(3)	GSE valve commands and logi	c		
GBH VAIVE	, Latus					
(/)		(/)	operations (The second open)			
(4) Analog and	discretes	(4) Data (strip chart and CRT) and				
			compare monitoring	·		
(5) Same as (2))					
SOFTWARE NON	RECURRING RECURRING	SOFT	NARE ALLOCATION:			
		FUNC	TION BLOCK NO	USA	AGE	
				W.R	ETR	
				-		
	Í					
				<u> </u>		
7				1.		

FUNCTION NO.	FUNCTIONS TITLE:	FUNCTIONS TITLE:						
2.5	Vent Remaining Pressurant							
UNCTION: Control valves to safe the pressurization system								
Jonetor varves								
REQUIREMENTS/DESC (1) Control A	RIPTION /B and GSE valves for vent	ing p	ressure					
(2) Monitor p	ressure periodically							
								
COMPUTER INTERFAC FEP, HIM	E							
	JT DESCRIPTION		OUTPUT DESCRIPTION		*** - * · · · · · · · · · · · · · · · ·			
(1) Manual in	(1) Manual initiation, A/B valve (1) A/B and GSE valve commands gener				a-			
	SE valve status; A/B	tion and logic operations						
pressure	status.	(2) Data (strip chart and CRT) and						
(2) Analog an	d discretes (pressure)	compare monitoring						
	21.00	<u> </u>						
								
				····				
				4				
					- T			
SOFTWARE NO	N RECURRING	 	VARE ALLOCATION:					
		FUNC	TION BLOCK NO.		AGE			
				WTR	ETR			
			and the second s	<u> </u>				

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FUNCTION NO.	FUNCTIONS TITLE:							
2.10	Isolate Mission Failed	Isolate Mission Failed Hardware						
FUNCTION: Trouble shoot	UNCTION: Trouble shoot and identify bad LRUs							
		···	11 St. 11					
REQUIREMENTS/DE	SCRIPTION and test suspect systems/cor	noonen	ts to identify bad LRUs		عتق حسن معادلة			
				* 10,11				
				, ,				
COMPUTER INTERFA	ACE IM	- 						
INPUT DESCRIPTION OUTPUT DESCRIPTION				******				
(1) Flight p	performance data, manual	anual (1) A/B commands, simulations, logic						
initiation system parameters			operations, data identification of					
			failed LRU.					
				77.1				
SOFTWARE IN	ON RECURRING RECURRING	SOFT	VARE ALLOCATION:					
		FUNC	TION BLOCK NO.	USA	4GE			
				WTR	ETR			
		<u> </u>						

FUNCTION NO.	FUNCTIONS TITLE:						
2.11	Scheduled Tug Pre-Maint	Scheduled Tug Pre-Maintenance Tests					
FUNCTION: Functional and	leak checks						
							
REQUIREMENTS/DESCR			And a factor of the second	di. sud disas e e e e e	••••		
	i calibration				•		
	ak and functional tests				······································		
(4) Leak check	c purge bag and APS system	1					
COMPUTER INTERFACE	E HIM						
	T DESCRIPTION		OUTPUT	DESCRIPTION	<u> </u>		
(1)-(4) Manual	initiation, system	(1)-(4)	Tug and GS	E commands,	logic		
parame	eters, valve status		operations	, data, exce	ption		
calibr	ation curves		reports, t	rend analysi	s, tim	ed	
			assess ent	s, leak rate	25		
					· · · · · · · · · · · · · · · · · · ·		
							
							
SOFTWARE ☑ NON	RECURRING RECURRING	SOFTWARE	ALLOCATION	· · · · · · · · · · · · · · · · · · ·		merald/dis	
		<u> </u>	BLOCK NO.		USA	ACE	
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FUNCTION NO:	FUNCTIONS TITLE:						
2.16		Isolate Hardware Causing Anomalies •					
FUNCTION: Troubleshoot as	nd isolate bad adapter LR	isolate bad adapter LRUs					
REQUIREMENTS/DESC	RIPTION	en de la companya de la companya de la companya de la companya de la companya de la companya de la companya de		<u></u>			
(1) Select and	i test suspect systems/co	mponents to identify bad LRUs	····.				
	•						
				···			
COMPUTER INTERFACE				48.			
	T DESCRIPTION	OUTPUT DESCRIPTION					
		(2)		-			
(1) Flight per	formance, data, manual	(1) A/B commands, simulations,	logic				
initiation	n, system parameters	operations, data, identifi	cation	1			
		of failed LRU.					
-				,			
			·				
			<u> </u>				
			·				
SOFTWARE	RECURRING RECURRING	SOFTWARE ALLOCATION:	· T · · · · · · · · · · · · · · · · · ·				
		FUNCTION BLOCK NO.		AGE			
			WTR	ETR			
			 				
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FUNCTION NO).	FUNCTIONS TITLE							
2.17		Scheduled Adapter Maintenance and Modification							
FUNCTION: Accompli	sh sche	duled maintena	nce, inspec	ction and	servic	ing			
REQUIREMEN	TS/DESCF	RIPTION e functional c	heck of the	a plumbin	σ.				
		laced or modif				tion	. • •	•	,
(Z) VEI	<u>l'iv leb</u>	Taced of modifi	rea composie	ent syste	III – 0.1541 - 94	<u></u>			
									
	11 20 -					**************************************		**********	
COMPUTER IN	TERFACE								
	INPU"	T DESCRIPTION			Ol	JTPUT DE	SCRIPTION		
(1)-(2)	Manual	initiation, s	ystem	(1)-(2)	Tug c	ommands	, logic op	eratio	ns,
	parame	ters, valve sta	atus,		data,	leak r	ates, exce	ption	
	calibr	ation curves			repor	ts			
		,							
			•						
SCETWARE	□NON	RECURRING 🗵	RECURRING	SOFTWAR	E ALLOC	ATION		POED VIRTH	
				FUNCTION	BLOCK	NO		USA	AGE
								WTR	ETR
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FUNCTION NO:	FUNCTIONS TITLE:			
2.18	Purge LH ₂ Tank			
FUNCTION: Reduce H ₂ conc	entration for safety			
	*			
REQUIREMENTS/DESC (1) Control a	RIPTION irborne LH, and H, valves	for a purge of the LH, tanks		
1	SE He valves for purging	<i>-</i> -		
(3) Vent gas	to a safe pressure and per	riodic pressure checks		
COMPUTER INTERFAC	E FEP			
INPU	JT DESCRIPTION	OUTPUT DESCRIPTION		
(1) Manual in	itiation, A/B valve	(1) A/B commands and logic o	peration	s.
		(2) GSE command and logic op	erations	
		integrated with airborne	operati	ons.
				-
			-,, -	
SOFTWARE KINO	N-RECURRING RECURRING	SOFTWARE ALLOCATION:		
		FUNCTION BLOCK NO	USA	AGE
			WTR	ETR

FUNCTION NO:	FUNCTIONS TO	TLE:				
4.6	Leak Chec	k Tug Pressuri	zation System			
FUNCTION:	egrity of Pressu	re System				
VELTLY THE	Caracy of theodor	<u> </u>				
			· · · · · · · · · · · · · · · · · · ·			
REQUIREMENTS/ (1) Contr	DESCRIPTION ol and monitor G	SE and A/B hel	ium valves for 1	eak check		
					ol coll	
		essure regular	ion to LH ₂ , LO ₂ ,	AID, and Id	er cerr	
react	ant tanks					
COMPUTER INTE	RFACE					
	INPUT DESCRIPTION		TUO	PUT DESCRIPTI	ON	
					_	
(1) Manua	l initiation, va	lves status,	(1) A/B and GSE	, commands,	logic	
analo	g and discrete p	ressures	operations	, parameter	monitoring	•
			data			

			<u></u>			
			COETWARE	TION.		
SOFTWARE	NON-RECURRING	RECURRING	SOFTWARE ALLOCA FUNCTION BLOCK N		Luc	\GE
			TONCTION BEOOK IV	0.	WTR	ETR
					VYIFI	EIN
						
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NAS8 31011 8-74 (PRELIMINARY)

FUNCTION NO:	FUNCTIONS TITLE:				
4.8	Leak Check LH ₂ Tank				•
FUNCTION:	om Tatosaita				
Verify LH ₂ Syst	em mtakita				
REQUIREMENTS/DESC (1) Control ai	RIPTION irborne valves for a press	<u>uriza</u>	tion and lockup cycle		
(2) Contingend	y control GSE helium valv	es pr	essurization source	1	
(3) Monitor pr					
	o a predetermined level				
(4) Vene gas (o a predetermined lever	- 			
COMPUTER INTERFAC	E				
INPU	T DESCRIPTION		OUTPUT DESCRIPTION		
(1) Manual ini	itiation, A/B valve	(1)	Commands and logic operation	ons	
status					
(2) Same inigi	ation as (i) above, GSE	(2)	GSE commands and logic oper	cations	3
valve stat	Tus		integrated with airborne		
(3) Analog and	discrete pressures	(3)	Data (strip chart and CRT)	and	
			compare for decay		
(4) Same as (1	`				-
(4) baide as (1	-/			<u> </u>	
		<u> </u>		<u> </u>	
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SOFTWARE INO	N-RECURRING RECURRING	 	WARE ALLOCATION: TION BLOCK NO.	1	
		FUNC	THON BLOCK NO.	WTR	AGE ETR
				1	E 1 15
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FUNCTION	NO:	FUNCTIONS TITLE:	. —					
4.9		Leak Check Fuel Cell Re	ell Reactant Tanks					
FUNCTION: Verify	reactant	: system integrity						
REQUIREM	ENTS/DESCI	RIPTION rborne and GSE F/C valves	for	a pressurization and lockur	cvcle			
	lonitor pr		<u>_</u>					
		o a predetermined level						

COMPUTER	INTERFACE	HIM						
	INPU	T DESCRIPTION		OUTPUT DESCRIPTION				
(1) M	lanual ini	tiation, A/B valve	(1)	A/B and GSE valve commands	, logi	c		
s	tatus, GS	E valve status, pressure		operations				
5	witch or	analog indication	(2)	Data (strip chart and CRT)	and			
(2) A	nalog or	discrete pressure	ļ	compare for decay		-		
(3) S	ame as (1	.)						
					•			
SOFTWARE	⊠ NO≀	RECURRING RECURRING	SOFT	WARE ALLOCATION:				
			FUNC	TION BI OCK NO.	USA	AGE		
					WTR	ETR		
			-			<u> </u>		

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FUNCTION N	O: FUNCTIONS TITLE:						
4.7	Leak Check LO ₂ Tank						
FUNCTION: Verify	LQ System Integrity						
REQUIREME	NTS/DESCRIPTION	in more and a second			·		
	ntrol airborne valves for a pres	suriza	tion and lockup cycle		-		
(2) Co	ntingency control GSE valves dur	ing a	pressurization and lockup	cycle			
	nitor pressures	<u>-</u>					
(4) Ve	nt gas to 19 ± 1 psia and lock o	p pres	sure				
COMPUTER	NTERFACE HIM						
	INPUT DESCRIPTION		OUTPUT DESCRIPTION				
	nual initiation, A/B valve	(1)	A/B commands and logic o	perations	3		
	atus	<u> </u>		•			
	me initiation as (1) above, GSE	(2)	GSE commands and logic o		3		
	lve status		integrated with airborne				
(3) An	alogs and discretes	(3)	Data (strip chart and GR and compare for decay	Τ)			
(4) Sa	me as (i)						
					,		
	i .						
SOFTWARE	NON RECURRING ☐ RECURRING		WARE ALLOCATION:				
		FUN	CTION BLOCK NO.	WTR	ETR		
				44111	Lin		
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FUNCTION NO.	FUNCTIONS TITLE:				
4.10	Vent Remaining Pressura	int			
FUNCTION:	rization System	•			
0420 22 050 41	LIBROLON DYBEON				· · ·
				.	
REQUIREMENTS/D	FSCRIPTION				
(1) Control	1 A/B and GSE valves for vent	ing p	ressure to a predetermine	d level	
(2) Moniton	r pressure periodically				
COMPUTER INTERI	FACE HIM				
ļ	INPUT DESCRIPTION		OUTPUT DESCRIPTION	V	
(1) Manual	initiation; A/B valve	(1)	A/B and GSE valve comman	13a \$	
	- -	(2)	generation and logic ope		
-	GSE valve status:	(0)			
	ce status	(2)	Data (strip chart and CR		<u>.</u>
(2) Analog	g and discretes (pressure)		compare monitoring for d	lec ay	
		<u> </u>			
		ļ		····	
		<u> </u>			
SOFTWARE E	NON RECURRING RECURRING	SOFT	WARE ALLOCATION:		
		FUNC	CTION BLOCK NO.	USA	\GE
			- 444	WTR	ETR
					-
			The state of the s	<u> </u>	

FUNCTION NO:	FUNCTIONS TITLE:			
4.14	Replaced Adapter Compa	onent and Modification Verificatio	n	
FUNCTION: Verify system p	erformance after replaced	component/modification activity		
	The state of the s			
DEOLUDEATA TARA	BUSTION			
REQUIREMENTS/DESC (1) Verify rep	laced or modified compone	nt system operation		
COMPUTER INTERFAC	E		······································	
нтм				
INPU	T DESCRIPTION	OUTPUT DESCRIPTION		
(1) Manual ini	(1) Manual initiation, system (1) Adapter commands, logic operations,			s,
parameters	, valve status,	simulations, data, exception	repo	rts
calibratio	n curves			
SOFTWARE NO	N-RECURRING	SOFTWARE ALLUCATION:		
		FUNCTION BLOCK NO.	USA	\GE
			WTR	ETR
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FUNCTION NO:	FUNCTIONS TITLE:								
4.17	Electrical Pre-Power Checks								
FUNCTION:	adv for nower up and system	for power up and systems testing							
verify rug ruc	ady for power up die byotom								
REQUIREMENTS/DE	SCRIPTION		i i mangana an an inggani a						
(1) Verify s:	ingle point ground								
(2) Verify bu	us isolation								
(3) Verify s:	ignal isolation			· · · · · ·					
COMPUTER INTERFA	ACE								
	PUT DESCRIPTION	OUTPUT DESCRIPTION							
(1) Test sig	nal response	(1) Test signal; data (strip ch	art &	CRT)					
(2)-(3) Test signal response		(2)-(3) Test signal; data (strip chart							
		and CRT) and exception r							
		Logical scan sequence be							
		applied signal and other							
		appried Signal and Other	porca	<u> </u>					
				<u> </u>					
				·					
SOFTWARE DA	NON-RECURRING RECURRING	SCFTWARE ALLOCATION:	Т						
		FUNCTION BLOCK NO.	h	AGE					
			WTR	ETR					
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FUNCTION NO	FUNCTIONS TITLE:				
4.19	Apply Power to Tug				
FUNCTION: Energize Tug sub	systems and verify power	quality			
	Systems and volume points	4000			
				··	
REQUIREMENTS/DESCI	RIPTION apply power to Tug buses				
(2) Selectively	energize/de-energize eac	h Tug sub	system and verify power		
quality.					
(3) Contingency	power removal in the eve	nt of a f	au¹t		
COMPUTER INTERFACE				 	
HIM					
INPUT DESCRIPTION OUTPUT DESCRIPTION					
(1)-(2) Commands, power and ground (1)-(2) Logical application of power.			•		
monitor			Noise and ripple compa	rison	with
			standards. Data (stri	p char	t
			and CRT)		
(3) Current/vol	.tage	(3) Log	gical power removal. Id	entifi	ca-
			on of the circuit and fa		
				· · · · · · · · · · · · · · · · · · ·	
				· · · · · · · · · · · · · · · · · · ·	
			•		
SOFTWARE NON	RECURRING B RECURRING	SOFTWARE	: ALLOCATION:		
		FUNCTION	BLOCK NO.	USA	AGE
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NASS-31011 8 /4 (PRELIMINARY)

FUNCTION NO:	FUNCTIONS TITLE:							
4.20	Load PCM Data Formal							
FUNCTION: Load Tug onbo	FUNCTION: Load Tug onboard computer with mission peculiar data format							
REQUIREMENTS/DESCR	RIPTION sion peculiar data and fo	rmat into the IPS						
								
	data format to onboard co	omputer						
(3) Verify of	nboard computer load							
COMPUTER INTERFACE HIM								
INPU	T DESCRIPTION	OUTPUT DESCRIPTION						
(1) NASA or	DOD mission parameters	(1) Verification of load int	o LPS					
(2) Manual i	nitiation	(2) Data format transfer to	onboar	·d				
		computer. Sum check, pa	rity c	heck				
(3) LPS and	onboard load	(3) Reformat change to an al	ternat	:e				
		format and bit by bit co	mpare.					
				-				
			*					
SOFTWARE TROOP	NRECURRING RECURRING	SOFTWARE ALLOCATION:						
201 TWANE 23 NO.	Theodining Linearing	FUNCTION BLOCK NO.	USA	AGE				
			WTR	ETR				
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FUNCTION 1	۷0:	FUNCTIONS TITLE:					
4.21		Measurement System End-to-End Calibration					
FUNCTION:	rete mea	surement system					
<u> </u>	race mea	Sur chieff System					
				, , , ,			
REQUIREM	NTS/DESCI	RIPTION					
(1)	Stimulat	e end instruments and com	npare results with a standard for	at			
	least th	ree voltage levels					
				- 			
COMPUTER		IIM					
	And the second second second second second	T DESCRIPTION	OUTPUT DESCRIPTION	***			
(1)	Calibrat	ion curve data manual	(1) Data (strip chart, X-V p	lotter			
		on; automatic or semi-	and CRT). Logical progr				
			of a series of variable				
	aucomaci	c procedure		SELMU	<u> </u>		
,			tions.		•		
<u> </u>	·						
							
					<u> </u>		
SOFTWARE	□non	RECURRING RECURRING	SOFTWARE ALLOCATION:				
			FUNCTION BLOCK NO.	USA	AGE		
				WTR	ETR		
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FUNCTION NO:	FUNCTIONS TITLE:							
4.22	Replaced Component	Replaced Component and Modification Verification						
FUNCTION:	UNCTION: Verify system performance after replaced component/modification activity							
VCITTY SYSEC	m periormane, arecriebra	CEG COMPONENT/ MOGILICATION ACTIV	ıcy					
<u> </u>								
	•							
REQUIREMENTS/DES				Tall to the secondaries of				
(1) Verify	replaced or modified comp	onent system operation						
				· · · · · · · · · · · · · · · · · · ·				
COMPUTER INTERFA	CE		•					
HIM	UT DECORIBITION	ONTRAL DECORRETION		** · · · · · · · · · · · · · · · · · ·				
INP	UT DESCRIPTION	OUTPUT DESCRIPTION						
(1) Manual	initiation, system	(1) Tug and adapter comman	ds, logi	<u>lc</u>				
paramet	ers, valve status,	operations, simulation	s, data,					
calibra	tion curves	exception reports.						
991-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1								
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SOFTWARE NO	N-RECURRING RECURRING	SOFTWARE ALLOCATION:						
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FUNCTION NO:	FUNCTIONS TITLE:						
4.23	Post-Maintenance MLI Purge						
FUNCTION: Dry MLI and p	urge bay (if purge bag is	opened during maintenance)					
			-				
			-				
REQUIREMENTS/DESCR	RIPTION		· · · · · · · · · · · · · · · · · · ·				
(1) Control	GSE and airborne N hot p	urge valves and He slow purge					
valves.	•						
COMPUTER INTERFACE HIM							
INPU ⁻	T DESCRIPTION	OUTPUT DESCRIPTION					
(l) Manual i	nitiation, valve status,	(1) GSE and Tug valve comman	ds.				
temperat	ute and pressures	Logic operations, timed	opera	-			
(analogs	and discretes)	tions					
			·				
-							
				 -			
							
				شيورنبط الأم			
SOFTWARE 図NON	RECURRING RECURRING	SOFTWARE ALLOCATION:					
		FUNCTION BLOCK NO.	USA	\GE			
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FUNCTION NO:	FUNCTIONS TITL	E:			· · · · · · · · · · · · · · · · · · ·			
4.24	Dry Tug I	Dry Tug Propellant Tanks						
FUNCTION:	Tug propolitant to-1	in to be seen	notible with					
pry new	Tug propellant tank	s to be com	hatiple Mitu	cryogenics				
0								
REQUIREMENTS	/DESCRIPTION				· · · ·			
(1) Con	trol airborne and C	SSE He, LO ₂	and LH, valv	es to purge LO ₂ and .	LH ₂ tan	ıks.		
(2) Pre	ssurize tanks to a	pre-determi	neó pressure	and periodic pressu	re chec	ks.		
				ę.				
COMPLITER INTE	REACE			181118 11118 11118 11118				
COMPUTER INTE HIM				والمستعدد والمستعدد والمستعدد والمستعدد والمستعدد والمستعدد والمستعدد والمستعدد والمستعدد والمستعدد والمستعدد	· · · · · · · · · · · · · · · · · · ·			
	INPUT DESCRIPTION			OUTPUT DESCRIPTION				
(1)-(2)	Manual initiation,	, A/B and	(1)-(2)	A/B and GSE valve c	ommands	·,		
	GSE valve status,	humidistat,	·	logic operations, e	xceptio	n		
	pressure transduce	ers (analogs		reporting, data				
	and discretes)		Maganta,					
		The state of the s						
						7		
SOFTWARE	NON-RECURRING	RECURRING	SOFTWARE AL	LOCATION:				
			FUNCTION BL	DCK NO	USA	AGE		
					WTR	ETR		
				11 11 11 11 11 11 11 11 11 11 11 11 11		[

FUNCTION NO:	FUNCTIONS TITLE:			
4.25	Mate Tug with Kick			
FUNCTION: Mechanical a	nd electrical mate Tug wi	th Kick Stage		
	·			
REQUIREMENTS/DESCI (1) LPS cont	RIPTION			
(1) LPS cont	rols pin pullers			,
				-
			· · · · · · · · · · · · · · · · · ·	
COMPUTER INTERFACE HIM				
INPU'	T DESCRIPTION	OUTPUT DESCRIPTION		
(1) Manual ini	tiation, extend and	(1) Pin puller commands, log	ic	
	sition information	operations		
				-
			· · · · · · · · · · · · · · · · · · ·	
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SOFTWARE NON	RECURRING RECURRING	SOFTWARE ALLOCATION:		
		FUNCTION BLOCK NO.		AGE
			WTR	ETR

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(PRELIMINARY)

FUNCTION NO:	FUNCTIONS TITLE:							
4.26	Verify Interfaces as	nd Prepare for SHE						
FUNCTION: Verify signa	l continuity across the Tu	ng/kick stage interface and kick s	tage					
power activat	tion.							
REQUIREMENTS/DESCI	RIPTION interface continuity pin l	oy pin						
(2) Energize	the Tug and apply power	to the kick stage						
(3) Apply co	ommand signals and evaluat	te responses						
(4) Continge	ency power removal in the	event of a fault						
COMPUTER INTERFACE	E HIM							
INPUT DESCRIPTION OUTPUT DESCRIPTION								
(1) Test signa	l response	(1) Test signal. Data (strip chart						
		and CRT), logical scan, exc	ceptio	n				
		reporting.						
(2)-(3) Comman	ds, power and ground	(2)-(3) Logical application.	Noise	and				
monito	r, scan of non-applied	ripple monitoring, data	a (str	ip				
interf	aces.	chart and CRT)						
(4) Current/vo	ltage	(4) Logical power removed. Ide	<u>entifi</u>	.ca-				
		tion of the circuit and the	e faul	.t				
				·				
				-				
SOFTWARE X NO	N-RECURRING RECURRING	SOFTWARE ALLOCATION:	-(<u>-</u>	·				
E231401	in the second se	FUNCTION BLOCK NO.	USA	AGE				
E			WTR	ETR				
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FUNCTION NO:	FUNCTIONS TITLE:							
4.27	Load and Verify Comp	Load and Verify Computer Software						
FUNCTION:								
Logo Tug Cor	mputer with Test Software							
REQUIREMENTS/DES (1) Load the	CRIPTION he Tug computer from the Ll	25						
(2) Verify	that the Tug computer is c	currectly loaded						
COMPUTER INTERFA HIM	CE							
INP	PUT DESCRIPTION	OUTPUT DESCRIPTION						
(1) March 12		(1) Varification that the T						
(1) Test p	rogram	(1) Verification that the T						
		computer is loading sum	check	<u> </u>				
		parity check						
(2) LPS and	d Tug computer loads	(3) Bit by bit comparison						
		W 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1						
SOFTWARE NO	ON-RECURRING RECURRING	SOFTWARE ALLOCATION:		'.				
SOLIVANE MIN	ON TECONITING	FUNCTION BLOCK NO.	USA	AGE				
			WTR	ETR				
			1					

FUNCTION NO:		FUNCTIONS T	ITLE:											
4.28		Systems 1	Health Evaluat	ıţi	ion									
FUNCTION:	_ C													
verity to	g subsy	/stem Fligh	t Gos and No-g	go	os.									
												··· - · -		
								·	· · · · ·		. - ·-			
REQUIREMENT						_	***************************************		Arrivus a	a• .			720 -	· · · · · · · · · · · · · · · · · · ·
		tht mode rec	node of the Tu	шg	.g01	Tu	g/ki	CK.	stage	9	··········			<u> </u>
		critical						 ,			 • · · • ·			
(2) Vell	Ty CIM	CITCICAL	t dife E i ons								·			·
				······										
COMPUTER INT	ERFACE													•
	INPUT	DESCRIPTION						(DUTPU	T DES	CRIP	TION		
(1)-(3)	Manual	initiation	, A/B system		(L)-(3) A	./в	c omma	nds,	log	ic op	eratio	ns,
	paramet	ers, previo	dus									trend		
	per form	nance data					c	omp	arisc	n				
										,	4			
			·											•
								·						
					<u> </u>									
							-:				****			
SOFTWARE	□NON	RECURRING	RECURRING	s	SOF	TWA	RE A	LLO	CATIC	N:				
				F	FUI	VCT10	ON BI	LOC	CNO.					AGE T
				\vdash	-								WTR	ETR
				-	<u> </u>					······································				
									······································					
									,					† · · · · · · · · · · · · · · · · · · ·

FUNCTION NO:	FUNCTIONS T	ITLE:						
4.39	Kick S	tage Power and	d Distribution System Checkout					
FUNCTION: Verify pr	FUNCTION: Verify proper power and power distribution							
				<u></u>				
								
REQUIREMENTS/I	DESCRIPTION ctively apply po	ower to kick s	tage buse	es				
				c stage subsystem and ve	rify			
	r quality and d							
(3) Cont	ingency remove	power in the e	vent of a	a fault.				
COMPUTER INTER								
	INPUT DESCRIPTION			OUTPUT DESCRIPTION				
(1)-(2)	Manual initiatio	on of	(1)-(2) Logical application of power.					
	commands, power	and ground		Noise and ripple compa	rison.			
	monitor			Data (strip chart and	CRT)			
(3) Curr	ent/voltage		(3) Lo	ogical power removal; fl	ag cir	cuit		
			an	d fault.				
			İ					
						-		
SOFTWARE	NON-RECURRING	☑ RECURRING	SOFTWARE	ALLOCATION:				
		 	FUNCTION	BLOCK NO.	USA	AGE		
					WTR	ETR		
				A CONTRACTOR OF THE CONTRACTOR				
			<u> </u>		-			

FUNCTION NO:	FUNCTIONS TITLE:							
4.40	Measurement System End to End Calibration							
FUNCTION:								
Calibrate measur	ement system (kick stage))						
REQUIREMENTS/DESC	DIRTION			e at great the transfer with	e. This plane area			
(1) Stimulate 6	end instruments and compa	re res	ults with a standard for a	t least				
three volts	age levels.							
THIEE VOICE	age Acvers.							
COMPUTER INTERFACE	=							
INPU	T DESCRIPTION		OUTPUT DESCRIPTION					
(1) Calibration curve data. Manual (1) Data (strip chart, x-y plotter								
initiation	. Automatic or semi-	ļ <u>.</u>	and CRT). Logical progre	ession o	f a			
automatic	procedure	ļ	series of variable stimu	lations.				
		1						
		 						
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		_						
SOFTWARE □NOI	N-RECURRING RECURRING	SOFT	NARE ALLOCATION:		, 100 1 ° 2 ° 1 ° 2 ° 2 ° 2 ° 2 ° 2 ° 2 ° 2 °			
JOI TWAILE END	THEODINING BY NEGOTIAN		TION BLOCK NO.	USA	AGE			
				WTR	ETR			
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FUNCTION NO:	FUNCTIONS TITLE:						
4.41	APS Pressure/Leak Checks	3					
FUNCTION: Verify pressure a	nd functional integrity o	of kick stage APS					
			<u>-</u> -	_,,,			
	<u></u>						
REQUIREMENTS/DESC (1) Control airb	RIPTION orne and GSE valves for a	pressurization and lockup cycle.					
(2) Monitor pres	sures						
(3) Control vent	ing						
COMPUTER INTERFACE							
INPU	T DESCRIPTION	OUTPUT DESCRIPTION					
(1) Manual init	iation, A/B and GSE	(1) A/B and GSE commands, logic	operat	ions			
valve status	. Pressure transducers						
(analog)							
(2) Analog and d	iscretes (pressure)	(2) Data (strip chart and CRT), P	ressur	e			
		monitoring and comparison ag	ainst	a			
		standard.					
(3) Same as (1)							
				· <u> </u>			
				· · · · · · · · · · · · · · · · · · ·			
SOFTWARE NO	N-RECURRING RECURRING	SOFTWARE ALLOCATION:					
Joi Wille British		FUNCTION BLOCK NO.	USA	AGE			
			WTR	ETR			
			ļ	_			
			1				
1							

FUNCTION NO:	FUNCTIONS TITLE:				
4.42	APS Functional Checks				
FUNCTION: Verify proper Al	PS valve response				
				 	
					
REQUIREMENTS/DESC		دمر الانجيس			
(1) Perform APS	functional test to verify	y_pro	per APS valve responses,		
i.e, logica	al sequences and timed read	tion			
					
COMPUTER INTERFAC	E				
	JT DESCRIPTION		OUTPUT DESCRIPTION	•	
(1) Manual init	iation, simulation	(1)	APS valve commands, data (s	trip	
of anomalie			chart and CRT)		
or dismarry					
		 			
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		-		<u>.</u>	
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		<u> </u>			····
SOFTWARE 전 NO	N-RECURRING RECURRING	SOFT	WARE ALLOCATION:	.,	
		FUN	CTION BLOCK NO.		AGE
				WTR	ETR
		 		 	
		-			

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FUNCTION NO:	FUNCTIONS TITLE:					
4.43	Control System Checkout					
FUNCTION: Verify	control system's ability	o dete	ermine spatial position and	 		
provide proper	response.			·······		
					-	
REQUIREMENTS/DESCI	RIPTION					
(1) Control GS	E and A/B power.			 .		
(2) Verify auto	opilot performance and sys	stem r	esponse, timing and phasing	<u> </u>		
(3) Verify ope	ration of flight computer	, IMU,	star tracker, sun sensor,	etc.		
004001750 117505405						
COMPUTER INTERFACE	нім					
1NPU	T DESCRIPTION		OUTPUT DESCRIPTION			
(1) Manual ini	tiation, voltage	(1) Logical sequence power control,				
sensing, c	urrent.		contingency power removal.	<u>. </u>		
(2) Manual ini	tiation system parameters	meters. (2) Sequence of stimulations and				
		L	simulations. Data (X-Y pl	otter		
			strip chart, CRT) logical	seque	ncing	
			and evaluation of sub-resu	ılts.		
(3) System par	ameters test programs,	(3)	Go-no go sequences, specia	11	<u>.</u>	
			stimuli, simulations logic	:al		
			evaluation of results.			
		· · · · · · · · · · · · · · · · · · ·		والتنازير والمسارات		
SOFTWARE NON	RECURRING XX RECURRING		ARE ALLOCATION:	T		
		FUNCI	ION BLOCK NO.	WTR	AGE ETR	
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FUNCTION NO:	FUNCTION NO: FUNCTIONS TITLE:				
4.44	4.44 RF System Checkout - Kick Stage				
FUNCTION:					
Verify functiona	l operation of communicat	ions a	and data management systems		
		-			
REQUIREMENTS/DESCR	RIPTION	n		 	
(1) Control pow	er application.			····	
(2) Perform RF	system functional checkou	ıt.		······································	
(3) Verify data	management system capabi	lity t	o store, condition, time to	eg, an	d
multiplex i	nformation.				
(4) Verify cent	(4) Verify central logic/computer and C&W.				
COMPUTER INTERFACE	HIM				
INPU'	F DESCRIPTION		OUTPUT DESCRIPTION		
(1) Manual init	iation, current and	(1)	Logical power application	and	
voltage sen	sing.		contingency removal.		
(2) Manual init	iation.	(2)	Commands and simulations.	Data	
			(CRT) logic evaluations of	fre-	
			quencies, power, spectral	conte	nts,
			VSWR, sensitivity.		
(3) Initiation		(3)	Commands logical simulation	ns.	
			Storage of received and no	n-rec	eived
			data. Logic evaluation of	data	
			modes.		
(4) System para	meters, test programs	(4)	Go-no go sequences and sti Logic evaluations of sub-t		
SOFTWARE NON	RECURRING A RECURRING	SOFTW	ARE ALLOCATION:		
		FUNCT	TON BLOCK NO.	USA	\GE
				WTR	ETR .
		-			

FUNCTION NO:	FUNCTIONS TITLE:				
4.46	CST Preps - Kick Stag	e			
FUNCTION:					
Configure high	to a gratana fan armbina	d avete	me toot		
Configure kick s	tage systems for combine	<u>a syste</u>	ms test.		
		,			
	10T 0 V				
REQUIREMENTS/DESCF (1) Control GSE	and airborne power appl	ication	•		
(2) Load flight	programs.				
(3) Assess read	y for test.	•			
		•			
COMPUTER INTERFACE				. 	
	HIM]	OUTDUT DECORPTION	·	
INPU	INPUT DESCRIPTION OUTPUT DESCRIPTION				
(1) Manual init	iation, current and	(1) Logical power application and			
voltage sen	sing.		contingency removal,		
(2) Tape or dis	c flight programs.	(2)	Load and verify loaded fli	ght	
			computer program.	·	
(3) System simu	lation results.	(3)	Simulations, logical sampl	le tes	t
			sequences, ordnance test o	levice	
			continuity sequences data		
		 			
			chart, CRT, X-Y plot time) heal	th
			monitor check - logic com	pariso	ns
			of readiness.		
SOFTWARE NO	RECURRING RECURRING	SOFTW	ARE ALLOCATION:	·	
		FUNCT	TON BLOCK NO.	USA	AGE
		ļ 		WTR	ETR
				<u> </u>	
		-		1	
		<u> </u>			

FUNCTION NO	: FUNCTIONS TITLE:			•			
4.47	Combined System Test	Combined System Test					
FUNCTION: Kick stage	e functional test of a simulate	ed mission.					
				<u>.</u>			
REQUIREMEN	TS/DESCRIPTION	npressed time functional test from		OF STREET			
	tdown thru S/C separation.						
Coun	edown thru by o Separations	,					
COMPUTER IN	TERFACE HIM						
	INPUT DESCRIPTION	OUTPUT DESCRIPTION		**************************************			
(l) Manua	al initiation system parameters	(1) Logical application of con	nmands	9			
and	responses.	stimuli and simulations. Compari-					
		son of responses with star	ndards	•			
		Data (CRT, X-Y plotter, s	trip				
		chart) exception reporting	g,				
		sequence status.					
			***	··			
SOFTWARE	□ NON-RECURRING XX RECURRING	SOFTWARE ALLOCATION:					
		FUNCTION BLOCK NO.	USA	AGE			
			WTR	ETR			

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FUNCTION NO:	FUNCTIONS TITLE:			
5.1	Tug and Spacecraft Mate	2		
FUNCTION: Mechanically mat	e S/C to tug or kick stag	ge .		
REQUIREMENTS/DESCR	RIPTION			
LPS controls pin	pullers.			<u> </u>
COMPUTER INTERFACE	HIM			
INPU [*]	T DESCRIPTION	OUTPUT DESCRIPTION	N	
		_		···
(1) Manual init	iation, extend and	(1) Pin puller commands, lo	gic	
retract pos	ition information.	operations.		
				. <u></u>
	-			
				· · · · · · · · · · · · · · · · · · ·
SOFTWARE EXNON	RECURRING RECURRING	SOFTWARE ALLOCATION:	_ 	
		FUNCTION BLOCK NO.	ļ	AGE
			WTR	ETR

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FUNCTION NO:	FUNCTIONS TITLE:				
5.2	Load and Verify Tug Co	mputer	Software		
FUNCTION: Load tug compute	r flight software.				
				·	
	Ju-				
REQUIREMENTS/DESC (1) Load the tu	RIPTION g computer from the LPS.				
	the tug computer is load	ed pro	perly.		
(3) Change miss	ion parameters and repeat	(1) a	nd (2).		
COMPUTER INTERFACE					
INPU	T DESCRIPTION		OUTPUT DESCRIPTION		
(1) Flight prog	gram (tape, disc, or wide	(1)	Verification that the tug	g compu	ter
band data s	stream).		is loading. Sure check,	parity	
			check.		
(2) LPS and tus	computer loads.	(2)	Bit by bit comparison,		M2-1-4-0-1
(3) New mission	n parameters (tape, disc,	(3)	Repeat (1) and (2).		~1 ·······
etc.) (1) a	and (2) report.				
				<u> </u>	
					*
					
					<u></u>
SOFTWARE XXVO	N-RECURRING RECURRING	SOFTW	ARE ALLOCATION:		
		FUNCT	ION BLOCK NO	USA	AGE
				WTR	ETR
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		<u> </u>			

NA\$8-31011 8-74 (PRELIMINARY)

FUNCTION NO:	FUNCTIONS TITLE:			
5.3	Connect S/C Simulator			
FUNCTION: Verify docki	ng/retrieval capability.			
REQUIREMENTS/I	DESCRIPTION			
HECOMENIEN 30/1	JESONIF HOW			
(1) Monitor	latching mechanism.			
COMPUTER INTER	RFACE HIM			
	INPUT DESCRIPTION	OUTPUT DESCRIPTION		
(1) Mechani	sm position information.	(1) Data (time tag, CRT) logi	cal	
(I) Hecdani	sm position information.		Cui	· · · <u>- · · · · · · · · · · · · · · · ·</u>
		check sequence.	•	·
<u> </u>				
SOFTWARE K	XNON-RECURRING ☐ RECURRING	SOFTWARE ALLOCATION:		•
SOI TWATE A	ANOTAL COMMO LI MEGGAMMA	FUNCTION BLOCK NO.	USA	AGE
			WTR	ETR
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FUNCTION NO:	FUNCTIONS TITLE:				
5.4	Functional Interfa	ce Tes	t (FIT)	-	
FUNCTION: Functionally ver	ify all Tug/kick stage/S/	C inte	rfaces.		
			•		:
	DIRTION	· · · ·			
REQUIREMENTS/DESCI (1) Verify sing	sle point ground and bus i	solati	on.		
(2) Provide fli	ght stimuli and verify mi	ssion	operation.		
					_
COMPUTER INTERFACE	HIM; FEP				
INPU	T DESCRIPTION	<u> </u>	OUTPUT DESCRIPTION		
				•	
(1) Test signal	response.	(1)	Test signal. Data (stri	p chart	and
			CRT) exception reporting	. Logi	cal
-			scan between applied bus	and oth	her
			buses.		
(2) System para	ameters and responses.	(2)	Command MSS/PSS to start	missio	n,
			provide flight go and no	⊶go sti	muli
			(logical operations). M		
		-			_ 1 1
		1	MSS/PSS evaluations. Ev	aluate	all
			test data.		
		<u> </u>			
SOFTWARE NO	N-RECURRING TRECURRING		ARE ALLOCATION:		
		FUNCT	ION BLOCK NO.	ļ	AGE
				WTR	ETR

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FUNCTION NO:	FUNCTIONS TITLE:			
.5.5	S/C to STDN/TDRSS/SCF	Comm Verification		
FUNCTION: Verify the payle	oad uplink and downlink to	each segment's controlling grou	nd	
station.				
			· 	
REQUIREMENTS/DESC (1) Tug rf grou	RIPTION und station(s) execute com	maand and verify open loop respon	se.	
(2) Kick stage	rf ground station command	d and response check.		
(3) S/C rf grow	und station command and re	esponse check.		
COMPUTER INTERFACE	E HIM			
เทคก	T DESCRIPTION	OUTPUT DESCRIPTION		
(1)-(3) Manual	initiation, subtest	(1)-(3) Commands to the rf ch	ieckou t	
completion	information.	test set, simulations (if required)		
		to the tug, data (CRT), 1	ogic_	
		evaluations of frequencie	s, pow	er.
		sensitivity.		
				····
SOFTWARE MON	N-RECURRING	SOFTWARE ALLOCATION:		
		FUNCTION BLOCK NO.	USA	AGE
			'.VTR	ETR
			 	
			 	

FUNCTION NO:	FUNCTIONS TITLE:			
5.6	Payload to Orbiter Co	mm Verification		
FUNCTION: Verify rf compat	ibility between the orbi	ter and tug communications s	ystems.	
		 -		
REQUIREMENTS/DESC	RIPTION			
(1)				
(l) Verify all	tug to and from orbiter	rr commands and responses.		
COMPUTER INTERFAC	E BED. UTM			
INPL	FEP; HIM	OUTPUT DESCRIP	TION	
				<u>.</u>
(1) Subtest con	mpletion information.	(1) Orbiter commands to		
		tug, simulations (if	required) to)
		the tug, data (CRT),	logic evalua	-
		tions of open loop p	arameters of	
		both the tug and orb	iter.	
•				
				·
SOFTWARE □NO	N-RECURRING XX RECURRING	SOFTWARE ALLOCATION:		
		FUNCTION BLOCK NO.	USAG	iΕ
			WTR E	ETR
		<u> </u>	<u></u>	

FUNCTION NO:	FUNCTIONS TITLE:				
5.10	Partial Tug Pressurant	Load			
FUNCTION:					
Pressurize tug [oressurization system to 1	/3_fli	ght pressure.		
					;
					*
REQUIREMENTS/DESC	RIPTION				
(1) Control GSI	and tug valves to pressu	ırize t	ug to 1100 psi.		
(2) Monitor pre	essures periodically.				
COMPUTER INTERFAC	E HIM; FEP				
INPU	T DESCRIPTION		OUTPUT DESCRIPTION		
(1) Manual init	tiation; A/B and GSE	(1)	A/B and GSE valve command	gener	ation
valve statu	ıs; A/B pressure status.		and logic operations.		
(2) Analog and	discretes (pressure).	(2)	Data (strip chart and CRT) and	
			compare monitoring.		· · · · · · · · · · · · · · · · · · ·
		<u> </u>		· · · · · · · · · · · · · · · · · · ·	······································
SOFTWARE EXNO	N-RECURRING RECURRING	 	ARE ALLOCATION:	T	
		FUNCT	ION BLOCK NO.	ļ	AGE T
				WTR	ETR
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				<u> </u>	
		<u></u>		 	-
				<u> </u>	<u></u>

FUNCTION NO:		FUNCTIONS TITLE:				
5.21		Tug and Spacecraft Ma	te			
FUNCTION:						· · · · ·
Mechanical	.ly mat	e the S/C to the tug or	kick st	age.		
REQUIREMENT	S/DESCF	RIPTION				
(1) LPS c	ontr o 1	s pin pullers.				
COMPUTER INT	ERFACE	HIM				
	INPU"	DESCRIPTION		OUTPUT DESCRIPTION		
(1) Manua	l init	iation, extend and	(1)	Pin puller commands, lo	gic	
retra	ct pos	ition information.		operations.		
	. <u>.</u>		ļ			71
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SOFTWARE	EX NON	RECURRING RECURRING	SOFTW	ARE ALLOCATION:		
			FUNCT	TION BLOCK NO.	<u> </u>	AGE
					WTR	ETR
						

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FUNCTION NO:	FUNCTIONS TITLE:								
6.7	Payload-Orbiter Interfa	ce Ver	ification						
FUNCTION:									
Verify payload	d-orbiter interface integrit	у.							
, , , , , , , , , , , , , , , , , , ,									
REQUIREMENTS/DE (1) Verify in	SCRIPTION nterface continuity pin by p	in and	all interface connectors	mated.					
(2) LPS ener	gizes the tug primary power	bus.							
	esses and evaluates replies		ach P/L computer.						
	propellant tank insulation p								
COMPUTER INTERF	ACE HIM and FEP								
IN	IPUT DESCRIPTION		OUTPUT DESCRIPTION						
(1) Test sign	nal response.	(1)	Test signal, data (strip	chart .	and				
			CRT), logical scan, excep	tion					
			reporting.						
(2) Commands	, current and voltage	(2)	Logical application and c	onting	ency				
monitor.			removal of power. Data (strip	-1				
			chart and CRT).						
(3) Manual in	nitiation; P/L computer	(3)	Test routine initiation i	n logi	cal				
replies.			sequence for each P/L com	puter.					
			Data (status, CRT).						
(4) Tug and	GSE valve status, pressure	(4)	Logical Tug and GSE valve	s comm	and				
(analogs	and discretes).		generation.						
SOFTWARE D	NON-RECURRING XX RECURRING	SOFTW	ARE ALLOCATION:						
		FUNCT	ION BLOCK NO.	USA	AGE				
				WTR	ETR				
					<u> </u>				
				-					
				 					
				<u> </u>	<u> </u>				

FUNCTION NO:	FUNCTIONS TITLE:				
6.8	Payload Measurement F	rofile			
FUNCTION:					
Establish pre-la	unch data baseline profil	e.			
REQUIREMENTS/DESC	RIPTION				
(1) Selectively	apply power to the compl	ete pa	yload.		
(2) Record amb	ent end instrument data.				
	- Harris Harris - Har				
COMPUTER INTERFAC	E FEP			·· ======	
INPL	T DESCRIPTION		OUTPUT DESCRIPTION		
(1) Manual ini	tiation of command	(1)	Logical application of pow	er.	
Sequence,	voltage and current	 	Data (strip chart and CRT)	•	
monitor.					
(2) P/L interle	aved data	(2)	Data recording and real ti	me eva	alua-
			tion of data.		
		ļ			
	•				
		<u> </u>			
SOFTWARE 151 NO	N-RECURRING RECURRING		ARE ALLOCATION:	r	
		FUNCT	TION BLOCK NO.		AGE
				WTR	ETR
		<u> </u>			

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FUNCTION NO: FUNCTIONS TITLE:						
6.9	Orbiter-P/L Functio	nal Interface Systems Test				
FUNCTION:						
Verify that th	e P/L and Orbiter are read	y to support the mission.		 -		
REQUIREMENTS/DES	CRIPTION					
(1) Perform a	n abbreviated mission (lau	nch through landing) test. LPS :	simulat	es		
flight pa	rameters, stimulates senso	rs, evaluates results, checks the	PMS			
evaluatio	n, and re-evaluates the da	ta management system.				
COMPUTER INTERFA	CE HIM, FEP, Decomm		•			
INF	UT DESCRIPTION	OUTPUT DESCRIPTION				
(1) On-board	initiation, Orbiter P/L	(1) Sequential simulations an	d			
data.		stimulations, logic opera	tions			
		(compare data), data reco	rding	and		
		status (tape, CRT, strip	chart)	•		
SOFTWARE NO	ON-RECURRING XX RECURRING	SOFTWARE ALLOCATION:				
		FUNCTION BLOCK NO.	USA	AGE		
			WTR	ETR		
			1			

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FUNCTION NO:	FUNCTIONS TITLE:			···	
7.1	Tug Pressurant and Fue	1 Ce11	Loading		
FUNCTION:					
Complete tug pre	ssurant loading and load	fuel c	ell reactants.	_	
-				***************************************	
REQUIREMENTS/DESC: (1) Control air	RIPTION borne F/C and GSE helium	valves	during F/C pressurization		
(2) Control air	borne F/C and GSE LO, and	LH _o v	alves during F/C loading a	nd	
topping.	2	2			
	d monitor main tanks pres	sure i	ntegrity check with orbite	r pipi	ne
connected.				•	
COMPUTER INTERFACE	FEP and HIM (GSE)				
INPU'	T DESCRIPTION		OUTPUT DESCRIPTION		•
(1)-(2) Master	sequence initiation,	(1)-	(2) F/C A/B and GSE He an	d pro-	
A/B and GSE	valve status, pressure		pellants valve commands,1	ogic o	pera-
switch or t	ransducer,		tions on valve sequence a	nd con	tin-
<u>-</u>			gency safing. Data (stri	p char	t or
			CRT).		
(3) Master sequ	ence initiation A/B and	(3)	A/B and GSE He valves com	mands,	
GSE valve s	tatus and pressure switch		logic operations. Data (strip	-
or transduc	er.		chart).	·	
				<u>,</u>	
SOFTWARE XXNON	RECURRING RECURRING	SOFTW	ARE ALLOCATION:		
		FUNCT	ION BLOCK NO.	USA	AGE
				WTR	ETR
				-	

FUNCTION	10:	FUNCTIONS T	TTLE:				
7.2		Countdo	wn				
FUNCTION:							
Load shu	ittle pro	pellants.					
		·	- 1 	 			
REQUIREME	NTS/DESCF	RIPTION					
(1) Con	trol LO2	and LH, ai	rborne and GS	E tug v	valves during loading f	or launch.	
(2) Fin	al paylo	ad Go-No-go	tests.				
COMPUTER	NTERFACE						
	INPUT	DESCRIPTION	V		OUTPUT DESCRIPTI	ON	
(1) Mas	ter seque	ence initia	tion, A/B	(1)	A/B and GSE LH ₂ and L	O ₂ valve	
and	GSE val	ve status.	pressure		commands, logic opera	tions.	
swi	tches or	transducer	, liquid	<u> </u>			
sen	sors.	11 1000					
(2) Tug	paramete	ers.		(2)	Sequencing, data, com	parisons.	
	···						
						·	
	 						
SOFTWARE	Ш мом	RECURRING	2 RECURRING	SOFTW	ARE ALLOCATION:		
		······································		FUNCT	TON BLOCK NO.	USA	AGE
						WTR	ETR
					<u> </u>		<u> </u>
				<u> </u>			

FUNCTION NO:	FUNCTIONS TITLE:				-
7.3	Terminal Countdown ar	d Launch			
FUNCTION:					
Launch shuttle.					
				-	_
				·	
REQUIREMENTS/DESC	CRIPTION ng countdown operations and	critical parameters	during the		
	count.				
	acility.				
	h GSE damage assessment.				
COMPUTER INTERFAC	CE FEP; HIM (GSE)				
INPI	UT DESCRIPTION	ОИТРИТ	DESCRIPTION		
(1) Master seq	quence initiation, tank	(1) Comparisons (of normal airb	orne	
pressures,	valve status.	functions, s	tatus, data (r	ecord)
(2)-(3) Valve	status, pressures, fire	(2)-(3) GSE valve	commands, st	atus,	
sensors (a	nalogs and discretes).	data.			
SOFTWARE KINO	N-RECURRING RECURRING	SOFTWARE ALLOCATION	l:		
		FUNCTION BLOCK NO.		·	AGE
				WTR	ETR
				L	

NAS8-31011 8-74 (PRELIMINARY)

MAINTENANCE REQUIREMENTS

1.0 <u>General</u> - Maintenance requirement analysis was performed to determine maintenance actions, tasks and frequencies, required to maintain the baseline Tug operational reliabilities of 0.97 for mission accomplishment. Also identified are the maintenance methods employed. The support equipment and facilities required, along with estimates of the time and personnel required to perform each maintenance action are identified on the Tug function description data sheet. In addition, component removal frequencies, mean time between failures, and mean time to replace predictions are provided for use in unscheduled maintenance, as well as off vehicle repair and spares requirements determinations. These data are documented on the Maintenance Requirements Data Sheets.

For identification and control purposes, all tasks have been numbered in accord with the Functional Flow Diagram.

- 2.0 <u>Maintenance Techniques</u> Time, on-condition, and conditioning monitoring philosophies were considered for application to Tug maintenance.

 These philosophies are defined as follows:
- 2.1 <u>Time</u> A component or item controlled on a time technique has a limit set in terms of hours, cycles, flights, calendar time, or other measures of time or events, at which limit the component or item must be removed and processed in the shop for return to zero-time.
- 2.2 On Condition A maintenance technique under which a determination of the condition of a component or item is made, at specified intervals, via measurement, test or other means, without removal, disassembly inspection or overhaul. Principally considered ground checkout activities.
- 2.3 <u>Condition Monitoring</u> A maintenance concept having neither hardtime limits nor on-condition as a primary maintenance process. Condition

moritoring is accomplished by having appropriate means of condition assessment available for detecting and resolving problem areas. These means range from notices of system operation problems and special analysis of unit performance on a whole feet basis, to real time monitoring of individual unit performance during operation.

There is implicit in these latter two concepts, the requirement that the condition assessment functions must disclose enough information about the item's health and failure resistance to ensure a reasonable confidence in its reliability for the next flight or time interval before the determination will be made again.

Examination of the Tug, its subsystems and components reveal that the foregoing maintenance techniques are applicable to the Tug. The Tug is comprised of few items having life/cycle limits within the planned operational life utilization (20 missions) of an individual vehicle. Therefore, the application of the time maintenance technique to the Tug will be minimal.

The baseline Tug, by necessity, will be well instrumented for flight control and safety purposes; and therefore, promotes the application of the condition monitoring concept in that functional condition assessment of a majority of components can be made via data generated during flight operations. Where instrumentation or information is lacking, functional checks or other on-condition, condition assessment actions will be performed.

3.0 Levels of Maintenance - Consistent with the Orbiter Maintenance
Plan, the preliminary Tug plan shall provide for maintenance to be accomplished at three levels, in terms of where the activity is performed.
They are:

- 3.1 Level I All maintenance activities performed directly on installed hardware. It includes on-vehicle fault detection, isilation, correction, and prevention through application of functions such as inspection, checkout, calibration, adjustment, repair, removal and replacement, servicing, etc.
- 3.2 Level IT Maintenance activities performed in direct support of Level I, consisting of repair and/or disposition of hardware removed during Level I maintenance. Level II maintenance will be performed at maintenance shops located at the launch site. The maintenance accomplished could range from preparation for shipment to Level III, through complete overhaul. The extent of Level II activity will be determined primarily by the economics involved in providing or not providing for the capabilities needed to accomplish the maintenance required and not necessarily by the nature or complexity of the required maintenance activity.
- 3.3 Level III Those maintenance activities, performed in direct support of Levels I and II, which will be performed at off site locations such as contractor wendor facilities or government facilities where the required skills, equipment, and/or facilities are available.

 4.0 Types of Maintenance The program consists of two types of activities, namely, scheduled and unscheduled maintenance. Scheduled maintenance is comprised of tasks or actions to be accomplished at specified intervals. The objective of these functions is to retain the inherent design level of reliability through analysis of flight data, inspection, checkout, calibration, adjustment, servicing, repair, removal, and replacement, etc., at specified times or intervals. Unscheduled maintenance is essentially corrective action resulting from scheduled tasks and condition monitoring and is comprised of essentially the same activities as scheduled mainten-

ance except they are performed for the express purpose of restoring degraded equipment to its original level of reliability.

- 4.1 The primary method of accomplishing unscheduled, "corrective", maintenance will be through removal and replacement of the faulty line replaceable units (LRU).
- 4.2 Unscheduled maintenance will be performed in parallel with scheduled maintenance to the maximum degree practicable, and
- 4.3 Maintenance will be done concurrently on all subsystems (avionics, propulsion, structures, etc.) to the maximum extent practicable.
- 4.4 The criticality of each Tug component was based on the following criteria.
 - a. Function criticality:
 - Any single failure that can compromise safety of orbiter crew.

一種語言 湯湯 としまかはおしまといれずり

- 2. Any single failure that can cause loss of Tug or payload.
- 3. Any single failure that can cause loss of Tug mission.
- 4. All others.
- b. Criticality considers:

Premature operation

Failure to operate on command

Improper operation.

5.0 Maintenance Requirements Data Sheets - The following data sheets identify the maintenance requirements associated with the various baseline Tug components, subsystems/system and structures from the time the Tug arrives at the Tug processing facility (TPF) until the Tug is ready for installation in the Orbiter payload bay or placement in storage. Table 5-1 identifies those items for which maintenance requirements data sheets exist.

TABLE 5-1 MAINTENANCE REQUIREMENTS EVALUATION

<u></u>		TABLE 5-1 MAII	1 MAINTENANCE							·		
	∠			AIN EVE		MAI	ΝI.	LF	₹U ·	RE	DD.	LEGEND:
ITEM	CRITICALITY	SYSTEM/COMPONENT IDENTIFICATION	LEVEL I	LEVEL II	LEVEL III	SCHED.	UNSCHED.	YES	N _O	YES	NO	REMARKS
1		Structures System	_	-				-	_	-		Not evaluated at this level
2	2	Forward Skirt	х	х		Х	Х		x	х		
3	3	Docking Mechanism	х	х		х	Х	х		х		
4	2	Main Skirt	х	х		Х	Х		х	х		
5	2	LH ₂ Tank	x			Х	X		X		х	In event of meteoroid penetration or severe spalling, item is non-repairable.
6	2	LO ₂ Tank	x			Х			х		X	Same as LH ₂ Tank
7	4	LH ₂ Tank Support	x			X	X	х		X		
8	4	LO ₂ Tank Support	х			Х	X	х		х		
9	4	Thrust Structure	х			Х	X	х		х		
10	2	Aft Adapter	Х	Х		х	X		X	х		
11	4	Latching Mechanism	Х	K		Х	X	х		х		
12	-	Propulsion System	••	-	-		-	-	-	-		Not evaluated at this level.
13	2	Main Engines	Х	х		X	Х	х		х		
14	-	Feed, fill, drain & vent S/S	-	-	ı	-	1	-	-		ī	Not evaluated at this level.
15	4	(F&D) Solenoid Cont. Valve	x	х		x	х	x		х		
16	4	(F&D) LH ₂ Fill & Drain Valve	х	х		х	х	х		х		
17	4	(F&D) LH ₂ Horiz. Dump Valve	х	х		х	х	х		х		
18	4	(F&D) LH ₂ Fill, Drain & Prevalve	X	x		x	х	х		х		
19	4	(F&D) LH ₂ Coupler	х			х	х	х		х		

TABLE 5-1 MAINTENANCE REQUIREMENTS EVALUATION

		TABLE 5-1 WAII	M	AINT		MAI TYP	NT.	LR		SPA REC	RE	LEGEND:
ITEM	CRITICALITY	SYSTEM/COMPONENT IDENTIFICATION	LEVEL I	LEVEL 11	LEVEL III		UNSCHED.	YES	NO	YES	NO	REMARKS
20	4	(F&D) LH ₂ Flex Line	х			х	х	х		Х		3
21	4	(F&D) LH ₂ Quick Disconnect	х			х	х	х		х		
22	4	(Vent) LH ₂ Vert. Vent Valve	x	х		х	х	х		Х		
23	4	(Vent) LH ₂ Horiz. Vent Valve	х	х		х	х	x		х		
24	4	(Vent) LH ₂ Thermodyn. Vent	X-			х	х	х		х		
25	4	(F&D) LO ₂ Fill, Drain & Dump Valve	х	х		x	х	x		x		
26	4	(F&D) LO ₂ Prevalve	х	х		х	х	х		х		
27	4	(F&D) LO ₂ Coupler	х			х	х	х		х		
28	4	(F&D) LO ₂ Flex Line	x			х	x	х		х		-
29	4	(F&D) LO ₂ Quick Dis- connect	х			х	х	х		х		
30	4	(Vent) Solenoid Cont. Valve	x	х		x	х	х		х		
31	4	(Vent) LO ₂ Vent Valve	х	X		x	х	х		х		
32	4	(Vent) LO ₂ Thermodyn. Vent	х			x	х	х		x		
33	4	(F&D) LH ₂ Plumbing	х			x	х		х		x	
34	4	(Vent) LH ₂ Plumbing	х	!		x	х		x		X	
35	4	(F&D) LO ₂ Plumbing	X			x	х		x		Х	
36	4	(Vent) LO ₂ Plumbing	x			х	X		x		x	
37	4	(F&D) Pneumatic Plumb.	х			x	x		х		х	
38	-	Pressurization S/S	1	-	-	-	-	-	-	-	-	Not evaluated at this level.
39	3	Helium Sphere	x	! !		x	х	x		х		

TABLE 5-1 MAINTENANCE REQUIREMENTS EVALUATION

		TABLE 5-1 MAIN	N.	AINT EVEL	. 1	MAI	NT.	LR		SPA	RE	LEGEND:
ITEM	CRITICALITY	SYSTEM/COMPONENT IDENTIFICATION	LEVEL I	LEVEL 1!	LEVEL III	_	UNSCHED.	YES	NO	YES	ON	REMARKS
40	4	Solenoid Control Valve	х	х		х	Х	Х		Х		
41	4	Helium Regulator	Х			х	y	Х		х		
42	4	Filter Assembly	X			х	х	х		х		
43	4	Helium Vent Valve	X	х		х	х	х		x		
44	4	Helium Quick Disconnect	X		,	х	Х	х		х		
45	4	Helium Coupler	X			х	х	х		х		
46	4	Helium Plumbing	Х			x	x		X		х	
47	-	Hydraulic S/S	-	-	-	-	-	-		-	-	Not evaluated at this level.
48	4	Actuator Assembly	X	х		х	х	х		х		
49	4	Main Pump	X	Х		х	х	X		х	į į	
50	4	Auxiliary Pump	Х	х		x	Х	х		x		
51	4	Check Valve	Х	х		X	х	х		х	<u> </u>	
52	4	Solenoid Seq. Valve	X	x		x	х	х		х		
53	4	Hi Press. Relief Valve	Х	х		х	х	х		x		
54	4	Lo Press. Relief Valve	x	х		x	X	х		х		
55	4	Bleed Valve	х	х		x	х	х		х		
56	4	Filter	Х			x	Х	x		х		
57	4	Hydr. Plumbing	Х			x	X		x		Х	
58	-	Prop. Load. & Measure. S/S	-	-	-	-	-	-	-	-	-	Not evaluated at this level.
59	3	LO ₂ Capacitive Mass Probe	х		х	x	x	x		x		
60	3	LH ₂ Capacitive Mass Probe	x		X	x	x	x		x	-	1
61	4	LO ₂ Control Assembly	х	x	i i	x	x	х		х		
<u></u>			!	i	<u> </u>			<u> </u>	<u>i</u>	<u>L</u>	<u> </u>	

TABLE 5-1 MAINTENANCE REQUIREMENTS EVALUATION

	J	TABLE 5-1 WAIN	М	AINT		MAI	NT.	LR		SPA	RE	LEGEND:
ITEM	CRITICALITY	SYSTEM/COMPONENT IDENTIFICATION	LEVEL 1	LEVEL II	LEVEL III	SCHED.	UNSCHED.	YES	NO	YES	NO	REMARKS
62	4	LH ₂ Control Assembly	Х	х		x	х	Х		х		
63	4	Power Supply	x	x		x	х	X		X		
64	4	Point Level Sensors	х			x	х	X		х		
65		Deleted										
66	-	APS Subsystem	-	-	-	-		**	_	-	-	Not evaluated at this level.
67	4	APS Motor Assembly	Х	x		x	х	х		х		
ó8		Deleted				į						
69	4	Solenoid Fuel Prevalve	х	x		x	х	х		х		
70	3	Filter	Х			х	х	х		x		
71		Deleted										
72	4	N2H4 Fill Q.D.	х			x	х	x		х	<u> </u>	
73	4	N2H4 Vent Q.D.	x			x	х	х		х	<u> </u>	
74	4	N ₂ H ₄ Prop. Tank	Х	x		х	х	х		х		
75	4	Helium Vent Valve	х	х		x	x	х		x		
76	4	Helium Vent Q.D.	х			x	х	x		x		
77		Deleted										
78	4	Helium Regulators	х	x		х	х	х		х		
79	4	Helium Sphere	х	х		х	х	х		x		
80	4	Helium Quick Disconnect	х			X	х	х		x		
81	-	Thermal Control System	-	-	-	-	-	-	-	-	_	Not evaluated at this level.
82	-	Active Thermal Cont. S/S	-		-	-	1	-	-	-	-	Not evaluated at this level.
83	4	Electrical Heater	x			x	X	x		x		
84	3	Freon Accumulator	х	X		x	Х	х		х		

TABLE 5-1 MAINTENANCE REQUIREMENTS EVALUATION

	J	TABLE 5-1 MAII	M	AINT		MAI	NT.	LR		SPA RE(RE	LEGEND:
ITEM	CRITICALITY	SYSTEM/COMPONENT IDENTIFICATION	LEVEL I	LEVEL II	LEVEL III	SCHED.	UNSCHED.	YES	NO	YES	ON	REMARKS
85	4	Freon Fill Valve	х			х	Х	х		X		
86	4	Freon Pump	x		х	х	х	х	i !	Х		
87	4	Dryer Assembly	х			х	х	x		х		
88	4	Filter	Х			х	х	х		х		
89	4	Filter Bypass Valve	х	х		x	x	х		х		
90	4	Heat Exchanger	х		į	х	х	х		х	ĺ	
91	3	Radiator	х		i 	x	x	х		х		
92	3	Selector Valve	x	x	<u> </u>	x	x	х		х		
93	4	Flow Cont. Valve	x	х		x	х	х		х		
94	3	Temp. Sensor	x			x	x	x		х		
95	4	Ηε. Cont. Valve	x	х		x	x	x		х		
96		He Regulator Valve	x	х		x	x	x		x		
97		He Vent Valve	Х	x		x	x	х				
98		Heat Pipe	x			х	Х	x		x		
99	4	Thermal Splice	x	}		x	x	x		х		
100	-	LH ₂ Tank Insulation S/S	-	-	-	-	-	-	-	-	-	Not evaluated at this level.
101	4	Multilayer Insulation	x			x			x		x	Non-repairable
102	4	Purge Bag	x			х	X		X		x	Repair limited to patch only.
103	-	LO ₂ Tank Insulation S/S	-	-	-	-		-	-	-	-	Not evaluated at this level.
104	4	Multilayer Insulation	x		1	х	1		X		X	Non-repairable
1.05	4	Purge Bag	x			х	X		X		x	Repair limited to patch only.
106	-	Insulation Purge S/S	-	· 	-	-		_	-	-	1	Not evaluated at this level.
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TABLE 5-1 MAINTENANCE REQUIREMENTS EVALUATION

	 	TABLE 5-1 MAIN		AINT		MAI				SPA		LEGEND:
	_	ļ		EVEL		TYP	E	LR	U	REC		ELACIAD.
ITEM	CRITICALITY	SYSTEM/COMPONENT IDENTIFICA: ON	LEVEL 1	LEVEL!!	LEVEL III	SCHED.	UNSCHED.	YES	ON	YES	ON	REMARKS
107	4	LH ₂ Purge Press. Reg.	х			х	х	х		x		
168	4	LO ₂ Purge Press. Reg.	x			х	х	х		х		
109	4	LH ₂ Purge Cont. Valve	X	X.		x	х	х		х		
110	4	LO ₂ Purge Cont. Valve	X	х		х	х	х		х		
111	4	LH ₂ Purge Vent Valve	X	х		х	x	Х		x		
112	4	LO ₂ Purge Vent Valve	X	х		х	х	х		х		
113	-	Passive Thermal Cont. S/S		-	-	-		-	-	-	-	Not evaluated at this level.
114	4	Radiation Shield	X			х	х	х		х		
115	4	Thermal Coating	х			х	х		x		х	Evaluated with structures.
116	-	Avionics System	-	-	-	_		-	-	-	-	Not evaluated at this level.
117	-	NG&C Subsystem	-	-	-	-	-	-	-	-	-	Not evaluated at this level.
118	4	Inertial Mea. Unit	X		x	x	х	х		x		
119	4	Rate Gyro	х		x	x	X	х		x		
120	4	Accelerometer	Х		x	х	x	Х		x		
121	4	Star Tracker	х	}	X	Х	X	Х		x		
122	4	Sun Sensor	х		X	X	X	X		x		
123	4	Elect. Control Unit	Х		X	X	X	Х		Х		
124	-	Rendezvous & Docking S/S	-	-	-	-	-	-	-	-	-	Not evaluated at this level.
125	3	Laser Radar	х		X	x	X	X		Х		
126	3	Laser Radar Elect.	Х		X	x	X	x		х		
127	-	Data Management S/S	-	-	-	-	-	-	-	-	-	Not evaluated at this level.
128	3	Digital Computer	х		X	x	х	x		х		

不停的意思的,这是是我们的是是不可以被告诉我的一个是不是是我的最后,他们是我们是我们是我们的是我们,我们也是是我们的人,我们也是是我们的人,我们们也是我们的人,

TABLE 5-1 MAINTENANCE REQUIREMENTS EVALUATION

		TABLE 5-1 WAI	M	AINT		MAI	NT.	LR		SPA	RE	LEGEND:
ITEM	CRITICALITY	SYSTEM/COMPONENT IDENTIFICATION	LEVELI	LEVEL II	LEVEL III	SCHED.	UNSCHED. "	YES	NO	YES	ON ON	REMARKS
				_					-			
129	4	Auxiliary Memory	Х		Х	Х	X	Х		Х		
130	4	Comp. I/F Unit	Х		Х	Х	Х	Х		Х		
131	4	Data I/F Unit	X		Х	Х	Х	X		Х		
132	4	Orbiter I/F Unit	х		Х	х	х	Х		х		
133	4	Tape Recorder	х		х	Х	x	X		Х	:	
134	4	Buffer/Formatter	х		х	х	х	х		х		
1.35		Communications S/S	-	-	-	-	-	-	••	-	-	Not evaluated at this level.
136	3	AESPA	х	İ	х	х	х	х		х		
137	3	Command Decoder	x	х		x	х	х		х		
138		Deleted			 							
139	4	TV Camera	х	x		х	х	Х		х		
140	4	TV Electronics	x	х	! !	х	х	х		х		
141	-	Measurements S/S	-	-	-	-	-	-	-	-	-	Not Evaluated at this level.
142	4	Signal Conditioners	х	х		x	x	х		х		
143	4	Temp. Sensor	х			х	х	х		x		
144	4	Press. Sensor	x			х	х	x	İ	x	<u> </u>	
145	4	Position Sensor	x			х	X	x		х		
146	4	Tachometer	x		!	х	х	x		x		
147	4	Accelerometer	x	:	!	x	х	х		х		
1.48	4	Flow Sensor	x	:	1	x	х	х		х		
149	4	Voltage Sensor	x	X	:	x	X	х		х		
150	4	Liquid Level Sensors	x	:	1	X	X	x		х		
151	4	Strain Gages	x			х	X	х	1	х	•	
		B /4 (PRELIMINARY)		<u> </u>			:		<u>L</u> .	<u></u>	: <u>}</u>	

TABLE 5-1 MAINTENANCE REQUIREMENTS EVALUATION

	>			AINT EVEL		MAI TYP	NT. E	LR	U	SPA REC		LEGEND:
ITEM	CRITICALITY	SYSTEM/COMPONENT IDENTIF!CATION	LEVEL I	LEVEL 11	LEVEL III	SCHED.	UNSCHED.	YES	NO	YES	ON	REMARKS
152	4	H ₂ Leak Detector	Х		Х	x	X	X		х		
153	4	0 ₂ Analyzer	X		X	X	X	х		х		
154	4	N ₂ H ₄ Detector	х		Х	X	X	Х		x		
155	4	RGA	х		Х	х	X	х		х		
156	4	Contamination Det.	Х		х	х	Х	Х		Х		
157	-	Elect. Pwr. & Distr. S/S	-	-	-	-	_	-	_	-	-	Not evaluated at this level.
158	4	Fuel Cells	х		х	х	х	х		x		
159	4	Battery	х	х		х		х		х		
160	3	Reactant Tank	x			х	х	х		x		
161	4	Power Proc. Unit	x	x		х	Х	х		x		
162	4	Power Distributor	x	х		х	x	x		x		
163	4	Cont. Distributor	x	x		x	x	x		x		-
164	3	F/C T/C Distributor	x	x		x	х	х		x		
165	3	Main Eng. Distributor	x	x		х	Х	х		x		
166	3	APS Distributor	Х	х		х	Х	Х		х		

NOTES:

- 1. Due to the lack of design data at this early stage of the program, such maintenance data as operational life, MTBF and MTBR are based on Tug life requirements in leiu of actual design characteristics of the individual maintenance item.
- 2. Whenever it was suspected that maintenance items were similar or identical they were grouped on a common Tug Maintenance Requirements Data Sheet.

MAINTENANCE ITEM DATA														
TABLE 5-1 REF: FUNCTION NO. Forward Skirt Item 2 2.7, 2.20 & 3.1 SYSTEM: Structures Subsystem: Bodyshell 2 CRITICALITY: 2														
Forward Skirt		It	em 2	2	.7, 2.20 & 3.1									
SYSTEM: Structures		<u></u>	CR											
FUNCTIONAL DESCRIPTION: Prov mechanism, nonpropulsive v														
PHYSICAL DESCRIPTION: 176"Dia. x 61.25"long x 0.50" thick, honeycomb core with .010" graphite epoxy face sheet, weight = 239 pounds. TUG LOCATION: ACCESSIBILITY LEGU														
Station 935.99 thru 997.24 Adequate No														
LIFE DATA														
OPERATION LIFE: SHELF LIFE: MTBF 4,000 Hrs. MTBR														
3,400 Hrs. TIME 20 CYCLES Indefinte (Design Goal) 6,720 Hrs.														
NO. TIMES REFURBISHABLE	ANTICIPATED REF	URB/10	0 FLIGHTS	SPARES F	REQUIRED:									
18		2.5		1 Shi	Set									
MAINTENANCE DATA				- 										
1 11	III	SCHD	UNSCHD F	PRIMARY T	ECHNIQUE									
MAINTENANCE X X	MAINTENANCE TYPE	Х	Х	On-cond	lition									
OFIREQUIREMENTS: Shock Accelerometers at at for the purpose of monitor	tackment fitting tring docking and l	Z3 (Z anding	axis) and load meas	station surement:	951.00 (X axis), s.									
MAINTENANCE FUNCTIONS: 1. SCHEDULED MIANTENANCE (a. Visual inspection for deformation. b. Visual inspection for c. Visual inspection for d. Review flight record 2. UNSCHEDULED MAINTENANCE	or evidence of cra or meteoriod damag or thermal coating ded data for evide (LEVEL I)	e. degraence of	dation. structura	al over-	load conditions.									
a. Repair in place anomalies noted during scheduled maintenance functions a through c. 3. UNSCHEDULED MAINTENANCE (LEVEL II) a. Perform radiographic inspection of the forward skirt if OFI data indicates over-load conditions, and repair as applicable.														
OTHER CONSIDERATIONS: REMAR	KS			1										

MAINTENANCE ITEM DATA				···				1	27:01:10
ITEM IDENTIFICATION:				T		.E 5-1 R	EF:		CTION NO.
Spacecraft Docking Mechani	.sm				It	em 3			7, 2.11 & 3.1
SYSTEM:	SUE	SYSTEM	1:				CRITIC	ALITY:	
Structures	Fo	rward	Skirt					3	
FUNCTIONAL DESCRIPTION: Provi retrieval of the spacecrast impact attenuation.									
PHYSICAL DESCRIPTION: The spensor frame, guides, car actuators.	acec	raft d e late	ocking mo	echan pneum	is ati	a cons: Lc/hydi	ists (rauli	of a sq c shock	uare spacecraft absorber/
TUG LOCATION:		ACCES:	SIBILITY				L.F	RU es. at	both the assembly
Front end of the Fwd, Skin	rt	Ade	quate						e part levels.
LIFE DATA								AATOB	
OPERATION LIFE:			SHELF LIF			MT4B,000			MTBR
3,400 Hrs. TIME 20	CYC	LES	Indefin	ite		(Desig			6,720 Hrs.
NO. TIMES REFURBISHABLE 18		ANTIC	PATED REF 2.5	URB/	100	FLIGHT	- 1	ARES RE Ship S	
MAINTENANCE DATA									·
1 11	111			SCH	₽↓	UNSCH	PRIA	MARY TEC	CHNIQUE
MAINTENANCE LEVEL X X		MAIN	ITENANCE	X		Х		n-condi	, tion
OFI REQUIREMENTS:	_1			A			<u> </u>	II-CORGI	
Shock accelerometer attac	hed	to the	spacecr	aft s	supp	port f	rame	in the	X axis.
MAINTENANCE FUNCTIONS: 1. SCHEDULED MAINTENANCE a. Visual inspection f b. Perform functional c. Review flight recor conditions. 2. UNSCHEDULED MAINTENANC a. Remove and replace b. Remove and replace	or echedded E (Idamadocl	evidence kout shock EVTL aged do	(extend/ data for I) ocking me echanism	retra evid	act den ism	and l ce of or su	atchi struc basse	ng). tural o	over-load
3. UNSCHEDULED MAINTENANC a. Perform radiographi applicable.	c i			moved	d d	ocking	; mech	anism a	and repair as
OTHER CONSIDERATIONS/REMAR	KS								
None									

MAINTENANCE ITEM DATA	4												
ITEM IDENTIFICATION:					TA	ABL	E 5-1 REF:		FUN	ICTION NO.			
Main Skirt						Ιt	em 4		2.	.7, 2.20 & 3.1			
SYSTEM: Structures			SYSTEM dyshel				CRI	TICALIT	Y: 2				
FUNCTIONAL DESCRIPTIO engines, pressuriza	N: Prov tion sy	ide ste	s stru m, APS	ctural s	uppor	t : s (for the I	H ₂ and	i LO s y	2 tanks, main stem.			
PHYSICAL DESCRIPTION: thick graphite epox								noneyco	— — omb	core with 0.010"			
TUG LOCATION:			ACCESS	SIBILITY				LRU					
Station 997.24 thru	1172.90	2	Ade										
LIFE DATA				Y		-							
OPERATION LIFE:				SHELF LIF	FE:		МТВБ 4,000 На			MTBR			
3,400 Hrs. TIME	20	CYC	LES	Indefin			(Design	,		6,720 Hrs.			
NO. TIMES REFURBISHAB	LE		ANTICI	PATED REI	FUHB/1	00	FLIGHTS	SPARE	SRE	QUIRED:			
18				2.5	;			L Sh	ip S	let			
MAINTENANCE DATA	·		<u></u>		SCHD UNSCHD PRIMARY TECHNIQUE								
444417774444	1 11	111	-1	TEALANOS	SCHE	}	UNSCHD P	THINIGOE					
MAINTENANCE LEVEL	хх		TYPE	ITENANCE	Х		х	On-condition					
OFIREQUIREMENTS. Shock accelerometer on the aft adapter									¥4	(X axis), also			
on the aft adapter attachment ring station 1172.902 (X axis). MAINTENANCE FUNCTIONS: 1. SCHEDULED MAINTENANCE (LEVEL I) a. Visual inspection for evidence of cricks, delaminations and structural deformation. b. Visual inspection for meteoroid damage. c. Visual inspection for thermal coating degradation. d. Review flight recorded shock data for evidence of structural over-load conditions. 2. UNSCHEDULED MAINTENANCE (LEVEL I) a. Repair in place anomalies noted during scheduled maintenance functions a through c. 3. UNSCHEDULED MAINTENANCE (LEVEL II) a. Perform radiographic inspection of the main skirt if OFI data indicates over-load conditions, and repair as applicable.													
OTHER CONSIDERATIONS None	over-load conditions, and repair as applicable. OTHER CONSIDERATIONS REMARKS												

MAINTENANCE ITEM DATA													
ITEM IDENTIFICATION:						TAE	SLE 5-1 r	REF:		FUN	ICTION NO.		
LH ₂ Propellant Tank	c					1	Item 5				.11, 2.3, 2.7, .1 & 4.8		
SYSTEM:		SUB	SYSTEM	1:				CRIT	ICALIT	Υ:			
Structures		M	ain Sk	irt				2	2				
FUNCTIONAL DESCRIPTION	^{N:} Provi	des	fuel	storage	capa	ıbil	ity.						
PHYSICAL DESCRIPTION: feet capacity, weigh	169.0" nt = 42	Dia 4.9	. x 17 4 pour	4.5"long	; Wit	ih €	llipti	ical	bu1kh	read	ls, 1748 cubic		
TUG LOCATION:		Ť	ACCES	SIBILITY					LRU				
Station 937.49 thru 1111.99 At elliptical bulkheads only No													
OPERATION LIFE: SHELF LIFE: MTBF MTDR 7,800 Hrs.													
8,400 Hrs. TIME 5		n/A											
NO. TIMES REFURBISHABL	.E		ANTIC	PATED REF	URB	_	Desi FLIGH			SRE	QUIRED:		
N/A N/A N/A													
MAINTENANCE DATA													
	1 11	111			SC	HD	UNSCH	PR	HMARY	′ TE(CHNIQUE		
MAINTENANCE LEVEL			MAIN	TENANCE	_	_			_	• •			
OFI REQUIREMENTS:	X	<u>.l.</u>	L		У	<u> </u>	<u> </u>		On-co	mdı	Fion		
Baseline defined OFI	adequ	ate	, also	conside	r ov	er-	load (FI	iefine	ed i	n item 4.		
MAINTENANCE FUNCTIONS 1. SCHEDULED MAINTEN a. Flush and purg b. Visual inspect c. Leak check (P 2. UNSCHEDULED MAINT	IANCE (se clea ion f Pressur ENANCE	nin bu e d (L	g. 1khead ecay a EVEL I	nd mass)	spec	tro	meter	as a	applic	ab1	e).		
a. If evidence of meteoroid impact, perform internal tank inspection (visual or light) for evidence of metal spalling, if detected perform proof pressure and leak test.													
OTHER CONSIDERATIONS/I During internal ins			fap	enetrati	on i	s d	eteste	ed th	ne tan	ıki	s non-reparable.		

MAINTENANCE ITEM DATA	Δ.													
ITEM IDENTIFICATION: TABLE 5-1 REF: FUNCTION NO. LO2 Propellant Tank Item 6 2.2, 2.7, 3.1 & 4.7														
LO ₂ Propellant Tank						Ιt	:em 6			2.2	2, 2.7,	3.1 & 4.7		
SYSTEM:		Ī	SUB	SYSTEM:				CRI	TICALIT	Υ:				
Structures		İ	M	ain Skirt					2					
FUNCTIONAL DESCRIPTIO	N:				-									
	Pr	ovi	des	oxidizer stor	age	cet	abili,	:у.						
PHYSICAL DESCRIPTION: 144.0"Dia. x 101.82 long ellipsoid, capacity of 640 cubic feet, weight = 243.3 pounds. TUG LOCATION: ACCESSIBILITY LRU														
Station 1121.99 thru 1223.81 At tank ends only No														
LIFE DATA														
OPERATION LIFE: SHELF LIFE: MTBF 7,800 Hrs. MTBR														
8,400 Hrs. TIME	50	(CYC	LES Indefini	te		(Desig				N/A			
NO. TIMES REFURBISHAB	LE			ANTICIPATED REF	URE	/100	FLIGHT	гs	SPARE	SRE	QUIRED:			
N/A				n/	'A									
MAINTENANCE DATA											N/A			
	1	- 11	111		sc	SCHD UNSCHD PRIMARY TECHNIQUE								
MAINTENANCE LEVEL	х			MAINTENANCE TYPE	Х		x		On-cor	ndit	ion			
OFI REQUIREMENTS:			!		<u></u> _		<u> </u>							
Same as item 5														
MAINTENANCE FUNCTION	IS:													
Same as item 5														
OTHER CONSIDERATIONS	/REM	IΔRK	<u>'S</u>							·				
Same as item 5	, , <u>, </u>	.~116												

MAINTENANCE ITEM DATA														
TABLE 5-1 REF: FUNCTION NO. LH2 Tank Support Item 7 2.7 & 3.1 SYSTEM: SUBSYSTEM: CRITICALITY: Structures LH2 Tank 4 FUNCTIONAL DESCRIPTION: Provides structural support for the LH2 tank between the														
LH ₂ Tank Support				It	em 7		<u> </u> -	2.7 & 3.1						
SYSTEM:	SUBSYSTER	Λ:			C	RITICALI	TY:							
<u> </u>	LH2 Tanl	Ç				4								
FUNCTIONAL DESCRIPTION:	vidae etri	ictural e		~+	for the	THe to	ale h	atriaan tha						
Main skirt and the applica	able tank.	,	uppo		TOT CHE	s muz ca	iik D	etween the						
PHYSICAL DESCRIPTION: 1.75	5" Dia, fi	lberglass	str	uts	with :	forward	and	aft titanium						
end flanges, weight = 2.87 pounds.														
TUG LOCATION: ACCESSIBILITY LRU														
TUG LOCATION: ACCESSIBILITY LRU Approximately station 1061.74 Adequate Yes														
LIFE DATA														
OPERATION LIFE: SHELF LIFE: MTBF MTBR														
3,400 Hrs. 20 Indefinite 4,000 Hrs. 6,720 Hrs.														
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED:														
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED: 18 2.5 1 Ship Set														
MAINTENANCE DATA			···											
MAINTENANCE		ITENANCE				7								
LEVEL	TYPE		Х		Х	0n-co	ndit	ion						
OFI REQUIREMENTS:														
Same as item 4														
1														
	····													
MAINTENANCE FUNCTIONS: I. SCHEDULED MAINTENANCE	/LEVEL TY													
a. Visual inspection for		e of cra	cks	or	structi	ral defe	orma	tion.						
b. Review flight record														
conditions 2. UNSCHEDULED MAINTENANCE	र राज्यस्य १	r\												
a. Remove and replace	*	-	ano	mal:	ies det	ected d	urin	g visual						
inspection of hardwa	are or if	OFI data	ind	ica	tes ove	er-load	cond	itions.						
								:						
OTHER CONSIDERATIONS/REMAR			_ •											
Support struts are consid	ered non-	-reparabl	e it	ems	•			!						

MAINTENANCE ITEM DATA														
TEM IDENTIFICATION: TABLE 5-1 REF: FUNCTION NO. LO ₂ Tank Supports Ttem 8 2.7 & 3.1														
LO ₂ Tank Supports		It	em 8		2.7 & 3.1									
SYSTEM:	SUBSYSTEM:		CF	RITICALIT	Y :									
Structures	LO ₂ Tank			4										
FUNCTIONAL DESCRIPTION: Provi Main skirt and the applica	ides structural su able tank.	pport f	or the I	2 tank	between the :									
PHYSICAL DESCRIPTION: 2.0" Dia. fiberglass struts with forward and aft titanium end flanges, weight = 1.625 pounds. TUG LOCATION: ACCESSIBILITY LRU														
100 2007/11014														
Approximately station 1172.9 Adequate Yes														
LIFE DATA														
OPERATION LIFE: SHELF LIFE: MTB4,000 Hrs. MTBR														
3,400 Hrs. 20 CYCLES Indefinite (Design Goal) 6,720 Hrs.														
NO. TIMES REFURBISHABLE	ANTICIPATED REF		FLIGHTS	S SPARES REQUIRED:										
18	2.5			1 Sh	ip Set									
MAINTENANCE DATA														
1 11	111	SCHD	UNSCHD	PRIMARY	TECHNIQUE									
MAINTENANCE LEVEL X	MAINTENANCE TYPE	х	х	On~con	dition									
OFIREQUIREMENTS: Same as item 4														
MAINTENANCE FUNCTIONS: Same as item 7														
OTHER CONCIDERATIONS/REMAR	KS			<u>-</u>										
Same as item 7	Same as item 7													

MAINTENANCE ITEM DATA													
ITEM IDENTIFICATION:					TAB	LE 5-1 i	REF:		FUN	ICTION NO.			
Thrust Structure					It	em 9				2.7 & 3.1			
SYSTEM:	SUBSYS	STEM					CRITI	CALIT	Υ:				
Structures	Main	Eng	ine					4					
FUNCTIONAL DESCRIPTION:	<u></u>												
Provides structure							y for	main	n en	gine and in			
PHYSICAL DESCRIPTION: Open fiberglass truss conic frustrum with a 7" Dia. gimba and has a forward diameter of 91.0" and a length of 28.5", weight = 28.8 pour													
TOG ECONTION:													
Aft end LO2 tank	quate					Yes							
LIFE DATA													
OPERATION LIFE:	ļ	SHELF LIF	=E:		4,860				MTBR				
3,400 Hrs. TIME 20	CYCLES	5	Indefin	ite		(Desig	gn Go	al)		6,720 Hrs.			
NO. TIMES REFURBISHABLE	AN	NTICIF	ATED RE		3/100	FLIGH	TS S			QUIRED:			
18			2.	5				1 Sh	цp	Set			
MAINTENANCE DATA						,			İ				
1 11	 			33112					PRIMARY TECHNIQUE				
MAINTENANCE LEVEL	1 1	MAIN' TYPE	TENANCE	X X One				Onec	ond	ition			
OFIREQUIREMENTS: Provide strain gauges at firings and stress data				-	vide	stre	ss da						
MAINTENANCE FUNCTIONS: 1. SCHEDULED MAINTENANCE (LEVEL I) a. Visual inspection for evidence of cracks or structural deformation. b. Review flight recorded stress data for evidence of over-stress conditions. 2. UNSCHEDULED MAINTENANCE (LEVEL I) a. Remove and replace thrust structure for anomalies detected during visual inspection or if OFI data indicates over-stress conditions.													
OTHER CONSIDERATIONS/REMARKS None													

MAINTENANCE ITEM DAT	A														
ITEM IDENTIFICATION:					<u> </u>		TAE	3LE 5-1 F	REF:		FUN	CTION	NO.		
Aft Adapter							I	tem 10			2	2.13,	2.20	& 3.	2
SYSTEM:			SUE	SYSTEM	1 :				CRI	TICALIT	Υ:				
Gh		1		n . 11.	1 1					_					
Structures FUNCTIONAL DESCRIPTIO	N: _T	L		<u>Bodys</u> t	mochania			naratoé	1 +	a /dani					
latching system and system including th	Sup	por	ts	the un	nbilical	pla	tes	and th	ie p	ropell	lant	drai	n and	dump)
PHYSICAL DESCRIPTION:	176	OIL :	n	T 2	22 011 1	- 1			1						
pounds.	170.	, U	ŊΙδ	. X 12	.3.0 10n	rg D	llui	caced	cyı	inder,	, we	ıgnı	= 500	,,3	
TUG LOCATION: ACCESSIBILITY LRU Station 1172 9 thru 1295 9 Adequate															
Station 1172.9 thru 1295.9 Adequate No															
LIECDATA															
LIFE DATA OPERATION LIFE: SHELF LIFE: MTBF MTBR															
								4,000							
3,400 Hrs. TIME	20		CYC	LES	Indefin			(Desig					20 Hr	s.	
NO, TIMES REFURBISHAB	LE,			ANTICI	PATED REF	FURE	3/100) FLIGHT	rs	SPARES	SHE	UUIKE	J:		
18	····				2.	5				1 Ship Set					
MAINTENANCE DATA	,		,				COUR TUNICOUR PRIMARY TI								
			111	-{		SC	CHD UNSCHD PRIMARY TECH					HNIQU	ŀΕ		
MAINTENANCE LEVEL	x	х		TYPE	TENANCE		X	х		On-co	condition				
OFFREQUIREMENTS: Shock accelerometer in the X axis.	s at	: at	tac	hment	fittings	Z4	& Z	Z5 (Z a	xis	and	at	stati	on 11	72.9	
MAINTENANCE FUNCTIONS: 1. SCHEDULED MAINTENANCE (LEVEL I) Same as item 2 2. UNSCHEDULED MAINTENANCE (LEVEL I) Same as item 2 3. UNSCHEDULED MAINTENANCE (LEVEL II) Same as item 2															
OTHER CONSIDERATIONS/REMARKS None															

T		· · · · · · · · · · · · · · · · · · ·								
MAINTENANCE ITEM DATA ITEM IDENTIFICATION:		TABLE 5-1 REF: FUNCTION NO.								
	un i con			Item 11			2.13, 2.17			
Aft Adapter Latching Mecha	itti Sin		1	3.2 & 4.14						
SYSTEM:	SUBSYSTEM	;		CRITICALITY:						
Structures	Aft Adap	ter			4					
FUNCTIONAL DESCRIPTION: Provides latching capability for mating the tug to the aft adapter during deployment and retrieval of the tug.										
PHYSICAL DESCRIPTION: Motor of physical description TBS.				ind la	tching me	chan	ism, detailed			
TUG LOCATION:	ACCESS			LRU		•••				
Approximately station 1172	2.9 Adequ	ate			Yes					
LIFE DATA				,						
OPERATION LIFE:		SHELF LIFE:		MTBF			MTBR			
3,400 Hrs. TIME 20	CYCLES	Indefinit	e	TBS			TBS			
NO. TIMES REFURBISHABLE	ANTICI	PATED REFU	RB/100	FLIGH	TS SPAR	SPARES REQUIRED:				
18		TBS			1	Ship	Set			
MAINTENANCE DATA I II III SCHD UNSCHD PRIMARY TECHNIQUE										
MAINTENANCE 1 1 1	111	TENANCE	CHD	UNSCH	PRIMAR	YIEC	SHNIQUE			
LEVEL	TYPE	1	Х	X Condition-Monitoring						
OFIREQUIREMENTS: Current	OFIREQUIREMENTS: Current signature of motor every time mechanism is operated									
MAINTENANCE FUNCTIONS: 1. SCHEDULED MAINTENANCE (LEVEL 7) a. Review flight current signature data to determine mission performance characteristics, establish trend analysis to determine long term degradation. b. Visual inspection of mechanical parts for wear and/or structural deformation. 2. UNSCHEDULED MAINTENANCE (LEVEL I) a. Remove and replace latching mechanism demonstrating evidence of wear or motor performance failure or degradation. 3. UNSCHEDULED MAINTENANCE (LEVEL II) a. Repair failed or degraded latching mechanism as applicable.										
OTHER CONSIDERATIONS/REMAR None	KS						, , , , , , , , , , , , , , , , , , ,			

MAINTENANCE ITEM DATA									
ITEM IDENTIFICATION:				TAI	TABLE 5-1 REF: FUNCTION NO.				
Main Engine				, I	2.7, 2.10, 2.1 2.12 & 3.1				
SYSTEM:	SUB	SYSTEM	l:		CRITICALITY:				
Propulsion	Me	in Eng	gine		2				
	<u> </u>								
FUNCTIONAL DESCRIPTION: Provingulse of 456.5 seconds,									
operation with 190 starts									
small V maneuvers.						<u> </u>			
PHYSICAL DESCRIPTION: The main engine is a Pratt & Whitney RL10 derivitive IIB engine with a 40" primary nozzle dia. and a 70.75" dia. nozzle extension. The overall length									
with nozzle retracted/extended is 55" and 110" respectively, weight = 442 pounds.									
TUG LOCATION:			SIBILITY			LRU			
Aft . irt		Ađe	equate			Yes			
LIFE DATA		l							
OPERATION LIFE:		-	SHELF LI	FE:	MTBF			MTBR	
5.0 Hrs. TIME 5	CYC	LES	Indefir	nite	6.0	Hrs.		5.0 Hrs (schd)	
NO. TIMES REFURBISHABLE	ANTICIPATED REFURB/100 FLIGHTS S						SPARES REQUIRED:		
4		<u> </u> 	20		TBD				
MAINTENANCE DATA		l							
1 11	111			SCHD	UNSCH	D PRIMAR	Y TE	CHNIQUE	
MAINTENANCE	 	MAIN	TENANCE		1		Condition - Monitoring		
LEVEL X X		TYPE		X	X	Condit			
OFI REQUIREMENTS.				4	•				
Baseline defined OFI appe			adequate	e with	the ad	dition of	f cu	rrent signatures	
for all solenoid actuated	l va	lves.							
1									
MAINTENANCE FUNCTIONS:						•			
1. SCHEDULED MAINTENANCE	(LEV	/EL I)							
a. Visual inspection i								pump torque	
checks, inlet valve b. Review OFI data to								failed or decreded	
components.	uer	ar milite	necessi	Ly LO L	CIIIO V C	and repre	100	rarred or degraded	
c. Perform pre-mainter	ance	e faul	t isolat:	ion tes	t to d	etermine	hea	1th of components	
not monitored by OF						. .			
d. Remove and replace 2. UNSCHEDULED MAINTENANCE		_		bly att	er eve	ry five r	niss	ions.	
a. Remove and replace	-		-	gine as	semblv	indicati	ine	failure or	
degradation based of		-	-		-		Ü		
b. Perform functional	tes	ting to	verify	integr	ity of	replaced	i co	mponent or	
assembly.				· · · · · · · · · · · · · · · · · · ·					
OTHER CONSIDERATIONS REMAR	łk.S								
See attached sheet for r	ema	inder d	of maint	enance	functi	ons.			

SUPPLIMENTAL SHEET FOR ITEM 13

MAINTENANCE FUNCTIONS: (continued)

- 3. SCHEDULED MAINTENANCE (LEVEL II)
 - a. Overhaul or repair main engine assembly as required after scheduled removal.

- b. Performed post maintenance functional test and return to storage.
- 4. UNSCHEDULED MAINTENANCE (LEVEL II)
 - a. Overhaul or repair main engine assembly or component as applicable after unscheduled maintenance requiring removal as a function of OFI data or pre-maintenance testing.
 - b. After repair perform functional testing and return to storage.

MAINTENANCE ITEM DATA										
ITEM IDENTIFICATION:			TAE	BLE 5-1 RE	F:	FUNCTION NO.				
Propellant (F&D) Solenoid	Cont		Item 15		2.1, 2.10, 2.11 & 3.1					
SYSTEM:	SUBS'	YSTEM	4		C	RITICALI	TY:			
Propulsion	Fill	, Fee	d, Drain	& Ven	t		4			
FUNCTIONAL DESCRIPTION: Provides control pressure for pneumatic actuated valves. PHYSICAL DESCRIPTION: TBS										
TUG LOCATION: ACCESSIBILITY LRU Intertank Adequate Yes										
LIFE DATA			A		МТВЕ		MTBR			
OPERATION LIFE:	SHELF LIFE:						INITON			
3,400 HRS.TIME 20	CYCLE		Indefin		<u> </u>	Goal)	6,720 Hrs.			
NO, TIMES REFURBISHABLE	A	ANTICIE	PATED REF	URB/10	0 FLIGHTS	SPARE	ES REQUIRED:			
N/A			2.5	j			TBS			
MAINTENANCE DATA				··		TI				
MAINTENANCE X X	-	MAIN' TYPE	TENANCE	SCHD X	UNSCHD					
OFFREQUIREMENTS: Continious current signature monitoring for each actuation during flight operation. MAINTENANCE FUNCTIONS: 1. SCHEDULED MAINTENANCE (LEVEL I) a. Review flight OFI data for evidence of failure or performance degradation. b. Perform leakage test as a part of system leak test. 2. UNSCHEDULED MAINTENANCE (LEVEL I) a. Remove and replace valves if flight data displays evidence of degradation or failure as a function of current signature deviations or if trend data shows a failure is imminent. b. After replacement perform functional and leak checks on replaced valve.										
3. UNSCHEDULED MAINTENAN a. Repair removed val OTHER CONSIDERATIONS REMAINED	ve as			test a	nd retur	n to st	orage.			

MAINTENANCE ITEM DATA								
ITEM IDENTIFICATION		TAB	TABLE 5-1 REF: FUNCTION NO.					
LH ₂ Fill and Drain Valve			I	Item 16			.1, 2.10, 2.11 & 3.1	
	UBSYSTEM:			1	CRITICALI			
Propulsion	Fill, Feed	i, Drain	& Ven	t		4		
FUNCTIONAL DESCRIPTION: Provid	les ground	l operat	ions f	ill and	1 drain	capab	ility for LH ₂ .	
PHYSICAL DESCRIPTION: TBS								
TUG LOCATION:	ACCESSI			LRU				
Aft Skirt	Adequ	ıate			Yes	s		
LIFE DATA					<u></u>			
OPERATION LIFE:		SHELF LIF			0 Hrs.	ł	MTBR	
3,400 Hrs. TIME 20 C		Indefini ATED REF			gn Goal) rs SPARI		6,720 Hrs.	
NO, TIMES REFURBISHABLE N/A	AN LICIP.	2.5	ong/10(∍r∟iGH1	J OFAR	TBD		
MAINTENANCE DATA								
1 	Ш		SCHD	UNSCH	D PRIMAR	RY TEC	HNIQUE	
MAINTENANCE LEVEL	MAINT TYPE	ENANCE					•	
OFI REQUIREMENTS:			X	1x_	Cond	ition	- Monitoring	
Not required valve used du	iring grou	und oper	ations	only.				
		****			_	pulli later i commen		
MAINTENANCE FUNCTIONS: 1. SCHEBULED MAINTENANCE (1	LEVEL I)							
a. Tug safing requiremen	nts will s							
after demate of the valve for evidence o			ret be	TIOLW ,	visual i	nspec	eron of rue	
2. UNSCHEDULED MAINTENANCE	(LEVEL I)	_			_	_	
a. If during fill or dradegradation, remove a								
replaced valve.	•		.Jear IV	TOULON	ar ana T	.uen C	OUN OI CHE	
3. UNSCHEDULED MAINTENANCE a. Repair failed valve			st and	leak (check an	d ret	urn to storage.	
\$								
								
OTHER CONSIDERATIONS/REMARKS	5							
None								

MAINTENANCE ITEM DATA										
ITEM IDENTIFICATION:		TABLE 5-1 REF:			FI	FUNCTION NO.				
LH ₂ Horizontal Dump Valv	Item 17				2.1, 2.10, 2.11 & 3.1					
SYSTEM:	SUE	SYSTEM	1:		CRITICALITY:					
Propulsion	F	ill, Fe	ed, Drai	ın &	Ver	nt		4		
FUNCTIONAL DESCRIPTION: Pr										
mission with dump being accomplished with orbiter in a landed configuration. Further, provides standby backup for the fill, drain and prevalve in the event of a flight failure of this valve.										
PHYSICAL DESCRIPTION:										
TBS										
TUG LOCATION: ACCESSIBILITY LRU										
LH ₂ Tank		I	dequate					es.		
LIFE DATA										
								MTBR		
3,400 Hrs. TIME 20							Hrs.		1,000 Hrs.	
NO. TIMES REFURBISHABLE			PATED REF	URE	3/100	FLIGHT	S SF		REQUIRED:	
10	10 30 TBS									
MAINTENANCE DATA										
MAINTENANCE	1 []	- -}	TENANCE	SC	HD UNSCHO PRIMARY			MARY T	ECHNIQUE	
	x	TYPE	TENANCE		X	x	Сот	Condition - Monitoring		
OFI REQUIREMENTS:										
Proximity Pickup.										
MAINTENANCE FUNCTIONS:										
1. SCHEDULED MAINTENANCE										
a. Review flight OFI b. Perform leakage te									e degradation.	
2. UNSCHEDULED MAINTENAN	CE (LEVEL :	I)	-						
a. Remove and replace b. After replacement										
3. UNSCHEDULED MAINTENAN	CE (LEVEL '	II)					_		
a. Repair removed val	ve a	s appl	icable, t	test	ane	d retu	rn to	stora	ige.	
									_	
OTHER CONSIDERATIONS/REMA	RKS									
None										

MAINTENANCE ITEM DATA											
ITEM IDENTIFICATION:					TABLE 5-1 REF:					CTION NO.	
LH ₂ Fill, Drain and Preva	11ve				Item 18			İ	;	2.1, 2.10, 2.11 & 3.1	
SYSTEM:	SU	BSYSTEM	:				CRITICALITY:				
Propulsion			d, Drair					4			
FUNCTIONAL DESCRIPTION: Prov	ride	s the f	unction	of	fil	l, drai	n an	nd act	s a	as a prevalve for	
LH2 propellant system, and the event of a failure of	id pi	rovides	a backu	ıp s	yst:	em for	the	horiz	on t	tal dump valve in	
PHYSICAL DESCRIPTION: TBS											
TUG LOCATION:		ACCESS	IBILITY				L	RU	-		
LH ₂ Tank		Inad	equate					Yes			
LIFE DATA		· · · · · · · · · · · · · · · · · · ·									
OPERATION LIFE:										MTBR	
3,400 Hrs. TIME 20	Hrs. TIME 20 CYCLES Indefinite					1,000) Hrs	i.		1,000 Hrs.	
NO. TIMES REFURBISHABLE		ANTICIF	PATED REF						RE	QUIRED:	
10		<u> </u>	30					TBS			
MAINTENANCE DATA	T					T	- [55]	***	TE (NINIOUE	
MAINTENANCE	111	-	TENIANICE	SC	HD	UNSCH	PIPE	IMARY	IEC	CHNIQUE	
LEVEL X X		TYPE	TENANCE	;	X	Х	Co	nditi	.on	- Monitoring	
OFI REQUIREMENTS:						<u> </u>					
Proximity Pickup											
MAINTENANCE FUNCTIONS:		······································	· · · · · · · · · · · · · · · · · · ·								
Same as Item 17											
OTHER CONSIDERATIONS/REMAR	KŞ	 					•			<u> </u>	
None											
		·									

MAINTENANCE ITEM DATA											
ITEM IDENTIFICATION:			TA	ABLE 5-1 F	REF:	FUNCTION NO.					
LH ₂ Coupler				Item 19		2.1, 2.7, 2.10 & 3.1					
SYSTEM:	SU	BSYSTEM	1:				RITICALITY:				
Propulsion	F-1	11. For	ed, Drai:	a & V/a	nt		4				
FUNCTIONAL DESCRIPTION: 1						L 14 +					
Fill & Drain flex line	;* rovras	.a .uce1	riace CO	mect1	on capa	DITELY IC	or the Orbitet PH ⁵				
PHYSICAL DESCRIPTION:						·					
TE	0.0										
TUG LOCATION:		ACCES	SIBILITY			LRU					
Aft Skirt			quate			Yes					
LIFE DATA		ــــــــــــــــــــــــــــــــــــــ									
OPERATION LIFE:		············	SHELF LII	FE:	MTBF		MTBR				
2 400 mm TIME 00	CV	CLES	T. 1. 54			O Hrs.	6 700				
3,400 Hrs. TIME 20	- 011		Indefia PATED RE			gn Goal) TS SPARE	6.720 Hrs SREQUIRED:				
18				.5		1	Ship Set				
MAINTENANCE DATA											
1	11 11			SCHO	UNSCH	D PRIMAR	Y TECHNIQUE				
MAINTENANCE LEVEL X		MAIN	TENANCE	Х	x	On -	Condition				
OFI REQUIREMENTS:	_1	. l									
None											
MAINTENANCE FUNCTIONS:	יי לי אומני	יד די									
1. SCHEDULED MAINTENAM a. Visual inspection				rface	scoring	and seal	degradation.				
2. UNSCHEDULED MAINTEN	MANCE (LEVEL	I)	_	- G	-	= """				
a. Remove and repla	ace wit	h new	coupler.								
ļ											
OTHER CONSIDERATIONS/RE	MARKS										
None											
NAS8-31011 8-74 (PRELIMINAR	Υ)		E -	29							

MAINTENANCE ITEM DAT	A														
ITEM IDENTIFICATION:							ı AB	3LE 5-1 F	REF:			NCTION NO.			
LH ₂ Flex Line							Ιſ	tem 20			2	.1, 2.7, 2.10 & 3.1			
SYSTEM:	•		SUE	SYSTEM	A:				CRIT	TICALIT	Ύ:				
Propulsion		!	_		ed, Drain				!	4					
FUNCTIONAL DESCRIPTION	N: P	rovi	.de	3 LH ₂ t	transfer	сара	ıbi]	lity f	rom	the co	oup]	ler to the LHo			
Fill and Drain val	ze.			4		•		•			•	4			
DINOSCO DE ESTADOS ES										·-					
PHYSICAL DESCRIPTION:	T	вѕ													
TUG LOCATION:				ACCES	SIBILITY	<u>.</u>	F		- $$	LRU					
Aft Skirt		Adec		Yes											
LIFE DATA															
OPERATION LIFE: SHELF LIFE: MTBF 4,000 Hrs. MTBR												MTBR			
3 /00 Hrs. 20 Tradefinite (Denier Carl) (700											6,720 Hrs.				
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRE															
18 ANTICIPATED REFORB/100 FLIGH															
18 2.5 1 Ship Set															
MANUE DATA	1	11	111	T		SCF	łD	UNSCH	D PR	IMARY	TEC	CHNIQUE			
MAINTENANCE				MAIN	ITENANCE				7		- '				
LEVEL	Х			TYPE		X	_	Х	_	0n - (Conc	dition			
OFI REQUIREMENTS:															
None															
1															
MAINTENANCE FUNCTION	'IG'														
	: ب														
Same as item 19															
!															
				*		i									
OTHER CONSIDERATIONS	REN	1ARK	S												
None															
+ + + +															
						_	_								

NAS8-31011 8-74 (PRELIMINARY)

MAINTENANCE ITEM DATA												
ITEM IDENTIFICATION:			TAE	BLE 5-1 REF	:	FUNCTION NO.						
LH ₂ Quick Disconnect			I	tem 21	···	2.1, 2.7, & 3.1						
SYSTEM:	SUE	BSYSTEM:		CR	ITICALI	Υ:						
Propulsion	Fi	11, Feed, Drain	. & Ven	t	4							
FUNCTIONAL DESCRIPTION: Pro	vid	es interface co	nnecti	on capabi	lity b	etween the Af	t					
Adapter and the umbilical				·	-							
PHYSICAL DESCRIPTION: TBS												
TUG LOCATION:		ACCESSIBILITY	<u> </u>		TLRU							
Aft Adapter		Adequate			Yes							
OPERATION LIFE: SHELF LIFE: MTBF MTBR												
j I				4,000 H								
3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs. NO TIMES REFURBISHABLE ANTICH ATED REFURB/100 FLIGHTS SPARES REQUIRED:												
18 2.5 Yes												
MAINTENANCE DATA												
MAINTENANCE	III											
LEVEL		TYPE	X	x	On ~ 0	ondition						
OFI REQUIREMENTS:				<u></u>								
None												
			<u></u>									
MAINTENANCE FUNCTIONS:												
1. SCHEDULED MAINTENANCE	(LE	VEL I)										
a. Visual inspection of						seal degrada	tion					
and perform leakage 2. UNSCHEDULED MAINTENANG			system	leak tesi	-							
a. Remove and replace			eak tes	t.								
1												
OTHER CONSIDERATIONS/REMAR	KS											
NOTE												

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MAINTENANCE ITEM DATA	Ą													
ITEM IDENTIFICATION:							TAE	3LE 5-1 F	₹EF:		FUNCTION NO.			
LH ₂ Vertical Vent V	alv	е					I	tem 22				2.1, 2.10, 2.11 & 3.1		
SYSTEM:		- 1		SYSTEM				1	CRI	TICALIT	'Y :			
Propulsion					ed, Drain					4				
FUNCTIONAL DESCRIPTIO vertical position.	N: P	rovi	.de:	venti	ing capal	bili	ty i	when ti	he]	LH ₂ ta	nk :	is in the		
PHYSICAL DESCRIPTION:	TB	S												
TUG LOCATION: ACCESSIBILITY LRU														
LH ₂ -Tank	Inade					Yes								
LIFE DATA														
OPERATION LIFE: SHELF LIFE: MTBF MTBR											MTBR			
3,400 Hrs. TIME 20 CYCLES Indefinite 1,000														
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED:											QUIRED:			
10 30 TBD														
MAINTENANCE DATA	,		_											
	1	11	111			~	HD	UNSCH	D P	RIMARY	/ TE	CHNIQUE		
MAINTENANCE LEVEL	х	X		MAIN TYPE	TENANCE	х		x]ondi+	ior	- Monitoring		
OFI REQUIREMENTS:	L	1	<u> </u>	1		1	-	J	`			- IN HE OVE THE		
Proximity Pickup														
MAINTENANCE FUNCTION	\S:													
Same as item 17														
= amo ao ream 1/														
					·									
OTHER CONSIDERATIONS	/REA	MARK	s		······································	 					<u></u>	-		
None			-											
1														

MAINTENANCE ITEM DATA										
ITEM IDENTIFICATION:					TAB	LE 5-1 F	REF:		FUN	ICTION NO.
LH ₂ Horizontal Vent Valve				ļ	I	tem 23	_			2.1, 2.10, 2.11 & 3.1
SYSTEM:	SUB	SYSTEM	1:				CRIT	ICALIT	Υ:	
Propulsion	Fi1	I, Fee	ed, Drain	1 &	Vent				4	
FUNCTIONAL DESCRIPTION:	idac	· vent	ina canal	.i1i	+ c	ahon t	he T	H to	nle i	is in the
horizontal position.	TÕCS	venc.	ing capat	7111	Ly v	viieii c	ne L	2	IIK .	is in the
PHYSICAL DESCRIPTION:										
TBS										
	 ,									
TUG LOCATION: LH ₂ Tank	į		SIBILITY equate					LRU		
1112 12112		THAC	Yes							
LIFE DATA										
OPERATION LIFE: SHELF LIFE: MTBF MTBR										
3,400 Hrs. TIME 20	LES	ite		1,0	00 н	rs.		1,000 Hrs.		
NO. TIMES REFURBISHABLE	ANTICI	URE	3/100	FLIGH	rs	SRE	REQUIRED:			
10 30 TBD										BD
MAINTENANCE DATA										
1 11										
MAINTENANCE LEVEL X X	1	TYPE	ITENANCE		v	77		1.4		36 70 1
<u> </u>	<u> </u>	<u> </u>			X	Х	1 6	onaic	10n	- Monitoring
OFI REQUIREMENTS:										
Proximity Pickup										
MAINTENANCE FUNCTIONS:										
Same as item 17										
Ì										
]										
										<u></u>
OTHER CONSIDERATIONS/REMAR None	KS									

MAINTENANCE ITEM DATA												
ITEM IDENTIFICATION:						TAI	BLE 5-1 F	REF:	FU	NCTION NO.		
LH ₂ Thermodynanmic	Vent	=					Item 24	4	1	2.1, 2.10, & 3.1	2.11	
SYSTEM:			SUB	SYSTEM	Λ:			CRI	TICALITY:			
Propulsion			Fi	.11, Fe	eed, Dra	in & Ve	nt		4		:	
FUNCTIONAL DESCRIPTION Both gas and liquid	are	Prov	ide	s zero	gravit	y therm	odynami	ic v	enting o	f gas only	when	
PHYSICAL DESCRIPTION:	TBS											
TUG LOCATION:				ACCES	SIBILITY				LRU			
LH ₂ Tank Adequate Yes												
LIFE DATA												
OPERATION LIFE: SHELF LIFE: MTBF 4,000 Hrs. 4,000 Hrs.												
3,400 Hrs TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs.												
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED: 18 2.5 SPARES REQUIRED: 1 Ship Set												
MAINTENANCE DATA												
	I II III SCHD UNSCHD PRIMARY TECHNIQUE											
MAINTENANCE LEVEL	MAINTENANCE MAINTENANCE											
OFI REQUIREMENTS:	X	X				X	Х	<u> c</u>	<u>ondition</u>	- Monitori	ng	
Outlet temperature		e a	nd	liquić	l sen s or	•						
1. SCHEDULED MAINTEN a. Review flight b. Perform leaka	NANC OFI ge t	da est	ta as	for ev	t of the	of faile system	ure or m leak	per tes	formance	degradation	n.	
2. UNSCHEDULED MAIN a. Remove and reperformance de	plac egra	e ti dat:	her ion	modyna •	mic vent							
b. After replacer 3. UNSCHEDULED MAIN a. Repair removed	rena	NCE	(L	EVEL I	II)							
a. Repair removed vent as applicable, test and return to storage.												
OTHER CONSIDERATIONS/	OTHER CONSIDERATIONS/REMARKS											
None												

MAINTENANCE ITEM DATA	·										
ITEM IDENTIFICATION:					ABLE 5-	REF:		FUNCTION NO.			
LO ₂ Fill, Drain & Dump V	/alve				Item 25			2.1, 2.10, 2.11 & 3.1			
SYSTEM:	SUE	SYSTEM	1:			CRI	TICALIT	īY:			
Propulsion	Fi	i11. Fe	ed, Drai	in & '	Vent	}	4				
FUNCTIONAL DESCRIPTION: Pro											
and airborne dump capab	ility	in the	e event o	of po	st laun	ch al	port.	apability for hog			
PHYSICAL DESCRIPTION: TBS								:			
								•			
		ACCEC	'IDII ITV				LRU				
TUG LOCATION: ACCESSIBILITY Adequate Yes											
LIFE DATA			SHELF LI		LAATO	<u> </u>		MTDD			
OPERATION LIFE:					4,000 Hrs.						
3,400 Hrs. TIME 20	CYC	LES	Indefin	nite	(Des	ign (6,720 Hrs.				
NO. TIMES REFURBISHABLE	SPARE	S REQUIRED:									
18 2.5 1 Ship Set											
MAINTENANCE DATA											
1	I II III SCHD UNSCHD PRIMARY TECHNIQUE										
MAINTENANCE LEVEL		MAIN	TENA.∢CE								
X	Х			X	X		Condi	tion - Monitoring			
OFI REQUIREMENTS:											
Proximity pickup											
MAINTENANCE FUNCTIONS:											
1											
Same as item 16											
OTHER CONSIDERATIONS/REMA	ARKS										
None											
1											

TEM IDENTIFICATION: LO2 Prevalve SUBSYSTEM: Propulsion SUBSYSTEM: Fill, Feed, Drain & Vent Functional Description: Provides the capability of control of feed of LO2 to the main engine during mission engine firings. PHYSICAL DESCRIPTION: TBS TBS TUG LOCATION: Intertank Adequate Adequate Adequate SHELF LIFE: MTBF 4,000 Hrs. 3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) NO. TIMES REFURBISHABLE 18 ANTICIPATED REFURB/100 FLIGHTS 1 Ship Set MAINTENANCE DATA MAINTENANCE DATA TRABLE 5.1 REF: FUNCTION NO. 2.1, 2.10, 2.11 & 3.1 ERITATION NO. LIFE DATA OPERATION LIFE: ANTICIPATED REFURB/100 FLIGHTS 1 Ship Set MAINTENANCE DATA TABLE 5.1 REF: FUNCTION NO. 2.1, 2.10, 2.11 & 3.1 ERITATION NO. LIFE DATA OPERATION LIFE: ANTICIPATED REFURB/100 FLIGHTS 1 Ship Set MAINTENANCE DATA
SUBSYSTEM: Propulsion SUBSYSTEM: Fill, Feed, Drain & Vent FUNCTIONAL DESCRIPTION: Provides the capability of control of feed of LO2 to the main engine during mission engine firings. PHYSICAL DESCRIPTION: TBS TUG LOCATION: Intertank ACCESSIBILITY Adequate Adequate SHELF LIFE: MTBF 4,000 Hrs. 1MTBR 4,000 Hrs. 1MTBR 4,000 Hrs. NO. TIMES REFURBISHABLE 18 ANTICIPATED REFURB/100 FLIGHTS 1 Ship Set MAINTENANCE DATA MAINTENANCE DATA PRIMARY TECHNIQUE
Fill, Feed, Drain & Vent FUNCTIONAL DESCRIPTION: Provides the capability of control of feed of LO ₂ to the main engine during mission engine firings. PHYSICAL DESCRIPTION: TBS TUG LOCATION: Intertank ACCESSIBILITY Adequate Adequate SHELF LIFE: MTBF 4,000 Hrs. MTBR 4,000 Hrs. 3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) ANTICIPATED REFURB/100 FLIGHTS 1 Ship Set MAINTENANCE DATA I II III SCHD UNSCHD PRIMARY TECHNIQUE
FUNCTIONAL DESCRIPTION: Provides the capability of control of feed of LO ₂ to the main engine during mission engine firings. PHYSICAL DESCRIPTION: TBS TUG LOCATION: Intertank ACCESSIBILITY Adequate Yes LIFE DATA OPERATION LIFE: 3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs. NO. TIMES REFURBISHABLE 18 ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED: 18 2.5 I Ship Set MAINTENANCE DATA
PHYSICAL DESCRIPTION: TBS TUG LOCATION: Thertank
PHYSICAL DESCRIPTION: TBS TUG LOCATION: Thertank
TUG LOCATION: The tank ACCESSIBILITY Adequate LIFE DATA OPERATION LIFE: 3,400 Hrs. TIME 20 CYCLES NO. TIMES REFURBISHABLE 18 ANTICIPATED REFURB/100 FLIGHTS 2,5 MAINTENANCE DATA I II III SCHD UNSCHD PRIMARY TECHNIQUE
TUG LOCATION: Thertank ACCESSIBILITY Adequate Ves LIFE DATA OPERATION LIFE: 3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) NO. TIMES REFURBISHABLE 18 ANTICIPATED REFURB/100 FLIGHTS 2.5 MAINTENANCE DATA I II III SCHD UNSCHD PRIMARY TECHNIQUE
TUG LOCATION: Thertank ACCESSIBILITY Adequate Ves LIFE DATA OPERATION LIFE: 3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) NO. TIMES REFURBISHABLE 18 ANTICIPATED REFURB/100 FLIGHTS 2.5 MAINTENANCE DATA I II III SCHD UNSCHD PRIMARY TECHNIQUE
Intertank Adequate Yes LIFE DATA OPERATION LIFE: 3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs. NO. TIMES REFURBISHABLE 18 ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED: 2,5 MAINTENANCE DATA I II III SCHD UNSCHD PRIMARY TECHNIQUE
Intertank Adequate Yes LIFE DATA OPERATION LIFE: 3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs. NO. TIMES REFURBISHABLE 18 ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED: 2,5 MAINTENANCE DATA I II III SCHD UNSCHD PRIMARY TECHNIQUE
Intertank Adequate Yes LIFE DATA OPERATION LIFE: 3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs. NO. TIMES REFURBISHABLE 18 ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED: 2,5 MAINTENANCE DATA I II III SCHD UNSCHD PRIMARY TECHNIQUE
OPERATION LIFE: 3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs. NO. TIMES REFURBISHABLE 18 ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED: 2.5 1 Ship Set MAINTENANCE DATA
OPERATION LIFE: 3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs. NO. TIMES REFURBISHABLE 18 ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED: 2.5 SCHD UNSCHD PRIMARY TECHNIQUE
3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs. NO. TIMES REFURBISHABLE 18 ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED: 2.5 1 Ship Set MAINTENANCE DATA
NO. TIMES REFURBISHABLE 18 ANTICIPATED REFURB/100 FLIGHTS 2.5 SPARES REQUIRED: 1 Ship Set III III SCHD UNSCHD PRIMARY TECHNIQUE
18 2.5 1 Ship Set MAINTENANCE DATA I II III SCHD UNSCHD PRIMARY TECHNIQUE
MAINTENANCE DATA I II III SCHD UNSCHD PRIMARY TECHNIQUE
I II SCHD UNSCHD PRIMARY TECHNIQUE
MAINTENANCE MAINTENANCE LEVEL TYPE
X X X Condition - Monitoring
OFIREQUIREMENTS: Proximity pickup
MAINTENANCE FUNCTIONS:
Same as item 17
OTHER CONSIDERATIONS/REMARKS
None
14C9 21011 9 74 /PPELIMINIARY) F = 36

MAINTENANCE ITEM DAT	A		-											
ITEM IDENTIFICATION:							TAE	BLE 5-1	REF:		FUI	NCTION NO.		
LO ₂ Coupler							It	tem 27				2.1, 2.7, 2.10 & 3.1		
SYSTEM:			SUB	SYSTEM	1:				CRI	TICALIT	Y:			
Propulsion			T 4	17 E/	ed, Drai	.a. c.	Vor	. +			4			
FUNCTIONAL DESCRIPTION Fill & Drain flex 1			.des	inter	face cor	nec	tion	n capa	bil			ne orbiter LO ₂		
PHYSICAL DESCRIPTION:	TI	3 S												
TUG LOCATION:				ACCESS	SIBILITY		<u></u> -	,		LRU				
Aft Skirt					luate					Yes				
LIFE DATA														
OPERATION LIFE:					SHELF LII	FE:		MTBF 4,00	0 н	rs.		MTBR		
3,400 Hrs. TIME 2	te (Design Goal) 6,720 Hrs.													
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED: 18 2.5 1 Ship Set														
MAINTENANCE DATA														
	1 11 111							UNSCH	ID P	RIMARY TECHNIQUE				
MAINTENANCE LEVEL	X			MAIN	TENANCE		ur.			0= -	Car	ndition		
OFI REQUIREMENTS:	<u> </u>		<u> </u>	<u> </u>		<u> </u>	X	<u>X</u>	!_	<u> </u>	001	(dicion		
None														
MAINTENANCE FUNCTION	VS:									······································				
Same as item 19														
-														
OTHER CONSIDERATIONS	/REM	IARI	<s< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></s<>											
None														
NACO 21011 D 24 /00CL HAIR	MADV	/ 3												

MAINTENANCE ITEM DATA												
ITEM IDENTIFICATION:				TA	6' E 5-1	REF:	FU	NCTION NO.				
LO ₂ Flex Line					tem 28	·		2.1, 2.7, 2.10 & 3.1				
SYSTEM:	SUE	SYSTEM	1:			CRIT	ICALITY:					
Propulsion	Fi:	ll, Fee	d, Drain	ı & Ver	ıt	<u> </u>	44					
FUNCTIONAL DESCRIPTION:	ari da	an I Oa	transfar	- canal	vility	from	the con	pler to the LO2				
Fill and Drain Valve.	, A T G (-s LO2	CLANSIE	. capa	TILLY	LLOm	the cou	plet to the 10.2				
PHYSICAL DESCRIPTION:												
TBS												
TUG LOCATION:		ACCESS	SIBILITY		_, _	Ti	LRU					
Aft Skirt		Adeq	luate				Yes					
LIFE DATA												
OPERATION LIFE:			SHELF LIE	 FE:	MTBF			MTBR				
					4,00	O Hrs						
3,400 Hrs. TIME 20	ÇYC	LES	Lte									
NO. TIMES REFURBISHABLE		ANTICI	FURB/10									
18 2.5 1 Ship Set												
MAINTENANCE DATA 1												
1 11	111			SCHD	UNSCH	1D PR	IMARY TE	CHNIQUE				
MAINTENANCE X		MAINTENANCE X X On - Condition										
OFI REQUIREMENTS:		<u></u>		<u></u>								
None												
						·						
MAINTENANCE FUNCTIONS:												
Same as item 19												
					•							
OTHER CONSIDERATIONS/REMAR	KS											
None												
NAS8-31011 8-74 (PRELIMINARY)			E - :	38	·····	, <u></u>	<u> </u>					

MAINTENANCE ITEM DAT	Α									ŝ	
ITEM IDENTIFICATION:						TA	BLE 5-1 I	REF:	FU	NCTION NO.	
LO ₂ Quick Disconned	et						Item 2	9		2.1, 2.7, 2.10 & 3.1	
SYSTEM:			SUB	SYSTEN	Λ:			CRITI	CALITY:		
Propulsion	_				eed, Dra				4		
FUNCTIONAL DESCRIPTION	N:	Prov	ride	sinte	erface co	onnecti	on cap	abili	ty betw	een the Aft	
Adapter and the umb	olli	cai	pan	ei on	the tug.	•					
PHYSICAL DESCRIPTION:											
PHYSICAL DESCRIPTION:	do.	BS									
	ı.	ניט									
TUG LOCATION:				ACCES	SIBILITY			-	.RU		
Aft Adapter					juate				Yes		
LIFE DATA											
OPERATION LIFE: SHELF LIFE: MTBF MTBR											
4,000 Hrs.											
NO, TIMES REFURBISHAB		(Desi; 0 FLIGH)			6,720 Hrs.						
18		ANTICI	2.5	Set							
MAINTENANCE DATA											
MAINTENANCE DATA	1 11 11 SCHD UNSCHD PRIMARY TECHNIQUE									CHNIQUE	
MAINTENANCE			-	MAIN	TENANCE	331.2	1	_			
LEVEL	X			TYPE		X	x		On - Co	ndiotion	
OFI REQUIREMENTS:	·			.1					<u> </u>	IN TOLIGI	
Same as item 21											
Danie as Item 21											
MAINTENANCE FUNCTION								···········			
MAINTENANCE FUNCTION	VS:										
Same as item 21											
OTHER CONSIDERATIONS	/REM	IARK	S				· · · · · · · · · · · · · · · · · · ·				
None											

MAINTENANCE ITEM DAT	A											
ITEM IDENTIFICATION:							TAE	3LE 5-1 F	REF:	FU	INCTION NO.	
LO Solenoid Contro	1 V	ent	Va1	ve			I	tem 30			2.1, 2.10, 2.11 & 3.1	
SYSTEM:			SUB	SYSTEN	<u></u> ۱:				CRITICA	ALITY:		
Propulsion		_	Fi	11, Fe	ed, Drai	in &	Vei	nt		4	·	
FUNCTIONAL DESCRIPTIO	N:	Prov	'ide	s cont	rol pres	ssur	e fo	or pne	umatic	valve	es.	
PHYSICAL DESCRIPTION:		TBS	3									
TUG LOCATION:				ACCES	SIBILITY				LR	Ū		
Intertank Adequate Yes												
LIFE DATA												
OPERATION LIFE:					SHELF LI	FE:		MTBF 4,000	Hrs.		MTBR	
?,400 Hrs. TIME 2	.0	• (CYC	LES	Indefir	nite			gn Goal	1)	6,720 Hrs.	
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED:												
N/A 2.5 TBD)	
MAINTENANCE DATA I II III SCHD UNSCHD PRIMARY TECHNIQUE												
MAINTENANCE	1	11	111	MAIN	TENANCE	SC	HD	UNSCH	DIPRIM	IARY TE	ECHNIQUE	
LEVEL X X TYPE X X Condition - Monitoring												
OFIREQUIREMENTS: Continious current	sig	natu	re	monito	oring for	ea:	ch a	actuati	ion dui	ring f	light operation.	
MAINTENANCE FUNCTION	1 S:						—					
Same as item 15												
OTHER CONSIDERATIONS	/REN	MARK	s	<u>-</u>	<u> </u>							
None												
NAS8-31011 8-74 (PRELIMIN	IARY	' }			E - 4	-0						

MAINTENANCE ITEM DATA											
ITEM IDENTIFICATION:			T.	ABLE 5-1	REF:	FUNCTION NO.					
LO ₂ Vent Valve				Item 31		2.1, 2.10, 2.11 & 3.1					
SYSTEM:	SUBSYSTEM	1:			CRITICALI	TY:					
Propulsion	Fill, Fee				4						
FUNCTIONAL DESCRIPTION: Prov	ides venti	ing capab	ility	for th	e LO ₂ tan	ik.					
PHYSICAL DESCRIPTION:											
TBS											
TUG LOCATION:	ACCESS	SIBILITY			LRU						
Intertank		quate			Yes	.					
LIFE DATA											
OPERATION LIFE: SHELF LIFE: MTBF MTBR 3,400 Hrs. 20 Indefinite 4,000 Hrs. 6,720 Hrs. TIME CYCLES (Design Goal)											
NO. TIMES REFURBISHABLE	S REQUIRED:										
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED: 2.5 TBD											
MAINTENANCE DATA											
LH	111		SCHE	UNSCH	D PRIMAR	Y TECHNIQUE					
MAINTENANCE LEVEL	MAIN TYPE	TENANCE			Condit	ion - Monitoring					
OFI REQUIREMENTS	<u> </u>		X	<u> </u>	Condit	Ton - ronicoling					
Proximity pickup											
MAINTENANCE FUNCTIONS:											
Same as item 17											
OTHER CONGINE ATTOMICS OF	V.C.										
OTHER CONSIDERATIONS/REMAR None	K5										
Notice											
NIACO 21011 D 74 (DDC) IMINIADVI											

MAINTENANCE ITEM DATA											
ITEM IDENTIFICATION:				Т	ABLE	5-1 R	EF:	FUN	ICTION NO.		
LO2 Thermodynamic Vent					Ite	em 32		2.	.1, 2.10, 2.11 & 3.1		
SYSTEM:	SUI	BSYSTEN	\$;			(CRITICALI	TY:			
Propulsion	1 .		ed, Drai					4			
FUNCTIONAL DESCRIPTION: Prov	ide	s zero	gravity	therm	nodyn	amic	venting	of	gas only when		
both gas and liquid are p	res	ent.	-		-				,		
PHYSICAL DESCRIPTION:											
твс											
TUG LOCATION: ACCESSIBILITY LRU											
LO ₂ Tank		Adec	luate				Yes				
LIFE DATA		· l									
OPERATION LIFE:			SHELF LI	FE:	M	TB500	MTBR				
3,400 Hrs. TIME 20	LES	te	(D	esig	n Goal)		6,720 Hrs.				
NO. TIMES REFURBISHABLE		ANTIC	PATED REI	FURB/1	00 FL	_IGHT:	S SPARE	S RE	REQUIRED:		
18			2.	.5			1	Ship	Set		
MAINTENANCE DATA											
1 11	111	 		SCHI	o lun	VSCHE	PRIMAR	Y TEC	CHNIQUE		
MAINTENANCE LEVEL X X		MAIN	TENANCE	х		x	Condi	tior	- Monitoring		
OFI REQUIREMENTS:					.,	******	L				
Same as item 24											
MAINTENANCE FUNCTIONS:											
Same as item 24											
									•		
<u>.</u>								•			
OTHER CONSIDERATIONS/REMAR	KS					· · · · · · · · · · · · · · · · · · ·					
None											

MAINTENANCE ITEM DATA													
ITEM IDENTIFICATION:			TAE	BLE 5-1 REI	=:	FUNCTION NO.							
LH ₂ Fill and Drain Plumbin	ng		ľ	tem 33		2.1, 2.7 & 3.1							
SYSTEM:	SUBSYSTEM	/ 1:	· · · · · · · · · · · · · · · · · · ·	CF	RITICALIT	Υ:							
Propulsion	Fi11, Fe	eed, Drain	& Ve	nt		4							
FUNCTIONAL DESCRIPTION: Provi Feed and Drain Subsystem.													
jacketed bellows joints.													
TUG LOCATION: ACCESSIBILITY LRU LH2 Tank, Intertank and Adequate No Aft Skirt													
LIFE DATA		SHELF LIFE		MTBF		MTDD							
OPERATION LIFE:		::	[MTBR								
	CYCLES	N/A	<u> </u>	N,	N/A								
NO. TIMES REFURBISHABLE	ANTIC	PATED REFU	JRB/100	RB/100 FLIGHTS SPARES REQUIRED:									
N/A	<u> </u>	1	.0		No								
MAINTENANCE DATA													
1 11	111		SCHD	UNSCHD	PRIMARY	TECHNIQUE							
MAINTENANCE X	MAIN TYPE	TENANCE	X	X	0n -	Condition							
OFIREQUIREMENTS: None MAINTENANCE FUNCTIONS: 1. SCHEDULED MAINTENANCE (LEVEL I) a. Visual inspection for evidence of cracks, leaks and structural deformation, and leak test as a part of the system leak test. 2. UNSCHEDULED MAINTENANCE (LEVEL I) a. If a leak is detected repair in place, and perform proof and leak test.													
OTHER CONSIDERATIONS/REMARK	(ξ												

在1900年,1960年,1960年,1960年,1960年,1960年,1960年,1960年,1960年,1960年,1960年,1960年,1960年,1960年,1960年,1960年,1960年,1960年,1

MAINTENANCE ITEM DATA											
ITEM IDENTIFICATION:				TAE	SLE 5-1 RES	÷:	FUNC	CTION NO.			
LH ₂ Vent Plumbing				:	Item 34		2.	1, 2.7 & 3.1			
SYSTEM:	SUE	SYSTEM	1:		CF	RITICALIT	Υ:				
Propulsion	Fi	11, Fe	ed, Drain	. & Ven	t	4					
FUNCTIONAL DESCRIPTION: Pro	vide	s all t	he plumb	ing in	terconne	ction fo	or th	ne LH ₂ Vent			
subsystem.											
PHYSICAL DESCRIPTION: TBS		·····									
155											
TUG LOCATION:		ACCESS	SIBILITY	 		LRU					
Fwd. Skirt and Intertant	ĸ	Adeo	No								
LIFE DATA											
OPERATION LIFE: SHELF LIFE: MTBF MTBR											
3,400 Hrs. TIME 20	CYC	LES	n/a			N/A	Ì	N/A			
NO. TIMES REFURBISHABLE			PATED REF	URB/100	FLIGHTS	SPARE	SREC	NUIRED:			
N/A 1.0 No											
MAINTENANCE DATA											
1	11 111			SCHD	UNSCHD	PRIMARY	' TECI	H. JIQUE			
MAINTENANCE X		TYPE	TENANCE	Х	х	On =	Cone	dition			
OFI REQUIREMENTS:						······································					
None											
MAINTENANCE FUNCTIONS:											
Same as item 33											
OTHER CONSIDERATIONS/REMA	RKS						··				
None	,,,,,										

MAINTENANCE ITEM DATA													
ITEM IDENTIFICATION:			Ī	ABLE	5-1 REF:		FUN	CTION NO.					
LO ₂ Fill and Drain Plumbi	ng			Ite	m 35		2	.1, 2.7 & 3.1					
SYSTEM:	SUBSYST	EM:			CRI	TICALIT	Υ:						
Propulsion		eed, Drair	_				4						
FUNCTIONAL DESCRIPTION: Pro and Drain subsystem.	vides al	l plumbing	inte	ercon	nection	s for	the	LO ₂ Fill, Feed					
PHYSICAL DESCRIPTION: 3.0" diameter aluminum insulated pipes with steel vacuum jacketed bellows joints.													
TUG LOCATION: ACCESSIBILITY LRU Intertank and Aft Skirt Adequate No													
LIFE DATA													
OPERATION LIFE: SHELF LIFE: MTBF MTBR													
3,400 Hrs. 20	N/A												
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED: N/A 1.0 No													
MAINTENANCE DATA													
MAINTENANCE I II	III MA	UNTENANCE	SCHI	D UN	ISCHD P	RIMARY	TEC	HNIQUE					
LEVEL	TY		Х		X	On ~	Cond	dition					
OFI REQUIREMENTS: None													
MAINTENANCE FUNCTIONS: Same as item 33	4 800												
OTHER CONSIDERATIONS/REMARK	KS												
None													

garangan katangan pangan kangan kangan ng makan mantalan na ang manakan ng pangan ng pangan ng mangan ng mangan

MAINTENANCE ITEM DATA	Α										
ITEM IDENTIFICATION:						TAE	3LE 5-1 F	REF:	FU	INCTION NO.	
LO ₂ Vent Plumbing						I	tem 36			2.1, 2.7 & 3.1	
SYSTEM:		SUB	SYSTEM	1:	1			CRIT	ICALITY:		
Propulsion		Fil	1, Fee	ed, Drain	1 & r	Vent	t		4		
FUNCTIONAL DESCRIPTIO subsystem,	N: Pro	vide	s all	the plum	nbing	g in	ntercor	nect	ion for	the LO ₂ Vent	
PHYSICAL DESCRIPTION: TBS			•								
TUG LOCATION. Intertank and Aft S	kirt			SIBILITY equate	LRU No						
LIFE DATA							,				
OPERATION LIFE:	20			SHELF LI	FE:		MTBF			MTBR	
3,400 Hrs.	LES				N/A		N/A				
NO, TIMES REFURBISHAB								s s	SPARES REQUIRED:		
N/A				1.	. 0				No		
MAINTENANCE DATA						•				*	
MAINTENANCE LEVEL	1 11 X	111	MAIN TYPE	TENANCE	SC)	HD	UNSCHI X			CHNIQUE	
OFI REQUIREMENTS: None MAINTENANCE FUNCTION	JS:										
Same as item 33											
OTHER CONSIDERATIONS None	REMARI	KS									
NACO 21011 0 24 (DOC) (MIN	A D.V.)				······		· · · · · · · · · · · · · · · · · · ·	 .			

は、「大きいとの人をおきらうだけの必要できる。」とは「大きの人を選手」になってある。「大きの人をは、」」というに、「大きの人をは、「大きの人をは、「大きの人をは、「大きの人をは、「大きの人をは、「大きの人をは、「大きの人をは、」」というに、「大きの人をは、」」」」」、「大きの人をは、「大きの人をは、「大きの人をは、「大きの人をは、「大きの人をは、「大きの人をは、「大きの人をは、」」」」、「大きの人をは、「大きの人をは、「大きの人をは、」」」」、「大きの人をは、「大きの人をは、「大きの人をは、」」」」、「大きの人をは、「大きの人をは、」」」」」、「大きの人をは、「大きの人をは、「大きの人をは、」」」」、「大きの人をは、「大きの人をは、」」」」」、「大きの人をは、「大きの人をは、「大きの人をは、」」」」、「大きの人をは、「大きの人をは、」」」」」、「大きの人をは、「大きの人をは、「大きの人をは、」」」」、「大きの人をは、「大きの人をは、「大きの人をは、」」」」」、「大きの人をは、「大きの人をは、「大きの人をは、」」」」」、「大きの人をは、「大きの人をは、「大きの人をは、「大きの人をは、「大きの人をは、」」」」、「大きの人をは、「大きの人をは、」」」」」、「大きの人をは、「大きの人をは、「大きの人をは、」」」」」、「大きの人をは、「大きの人をは、」」」」」、「大きの人をは、「大きの人をは、「大きの人をは、」」」」」、「大きの人をは、「大きの人をは、」」」」」、「大きの人をは、「大きの人をは、「大きの人をは、」」」」」、「大きの人をは、「大きの人をは、「ない」」」」」」、「ない、「ない」」」」」、「ない、「ない」」」」」」、「ない、「ない」」」」」、「ない、「ない、」」」」」」、「ない、「ない、」」」」」」、「ない、「ない、」」」」」」」、「ない、「ない、」」」」」、「ない、「ない、」」」」」」、「ない、「ない、」」」」」」、「ない、「ない、」」」」」」」」、「ない、「ない、」」」」」」、「ない、「ない、」」」」」、「ない、「ない、」」」」」、「ない、「ない、」」」」、「ない、」」」」」、「ない、「ない、」」」」」、「ない、「ない、」」」」、「ない、「ない、」」」」」、「ない、」」」」」、「ない、」」」」」、「ない、「ない、」」」」」」、「ない、」」」」」、「ない、」」」」」、「ない、」」」」、「ない、」」」」、「ない、」」」」」、「ない、」」」」」、「ない、」」」」」、「ない、」」」」、「ない、」」」」、「ない、」」」」、「ない、」」」」、「ない、」」」」、「ない、」」」」、「ない、」」」」、「ない、」」」」、「ない、」」」」、「ない、」」」、「ない、」」」」」、「ない、」」」」、「ない、」」」、「ない、」」」」、「ない、」」」、「ない、」」」」、「ない、」」」」、「ない、」」」」、「ない、」」」」、「ない、」」」」、「ない、」」」」、「ない、」」」」、「ない、」」」、「ない、」」」」、「ない、」」」」」、「ない、」」、「ない、」」」、「ない、」」」」、「ない、」」」、「ない、」」」、「ない、」」」」、「ない、」」」、「ない、」」」、「ない、」」」、「な

							 				
MAINTENANCE ITEM DATA		<u> </u>		—r		···		T			
ITEM IDENTIFICATION:				ľ	TAB	LE 5-1 RE	F:	FUN	ICTION NO.		
Pneumatic Plumbing					Ιt	em 37		<u> </u>	.1, 2.7 & 3.1		
SYSTEM:	SUE	BSYSTEM	l:			С	RITICALI	TY:			
Propulsion	Fi	11, ree	d, Drain	n & Vent 4							
FUNCTIONAL DESCRIPTION: Profession of Profession Profession of Profession Profession of Profession Profession of Profession Profession of Profession Profession of Profession Profession of Profession	ovide sub	es all system	the pneu pneumati	mat .c a	ic p ctua	oressure ited val	lines ves.	in s	support of the		
PHYSICAL DESCRIPTION: Vario	ous ‡			ra:	Lumi	inum tub	ing.				
TUGLOCATION: Fwd. Skirt, Intertank, A Skirt and Aft Adapter	Aft	}	BILITY				LRU	Г о			
LIFE DATA											
OPERATION LIFE:		E:					MTBR				
3,400 Hrs. TIME 20	CLES		N/A				N/A				
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED: N/A 1.0 No											
MAINTENANCE DATA											
I	11 111			SC	HD	UNSCHD	PRIMAR	Y TE	CHNIQUE		
MAINTENANCE LEVEL X		MAIN TYPE	TENANCE	:	X	x	On	- C	ondition		
OFI REQUIREMENTS: None	•••										
MAINTENANCE FUNCTIONS: Same as item 33											
OTHER CONSIDERATIONS/REMA	ARKS			****							
_											

MAINTENANCE ITEM DATA				· ************************************								
ITEM IDENTIFICATION:					TA	BLE 5-1 R	EF:	FUN	ICTION NO.			
Helium Sphere					I	tem 39	& 81	2	2.1, 2.7 & 3.1			
SYSTEM:	SUBS	SYSTEM	1:				CRITICALI	TY:				
Propulsion	Pre	≥ssuri	zation				3					
FUNCTIONAL DESCRIPTION: Provurization, purge and Purg	vides ge bag	Heliu g pres	m storag ssure bla	ge c inke	apal	oility	for prop	ella	nt tank press-			
PHYSICAL DESCRIPTION: 4.5 1 29 inches.	t ³ , 3	3200 p	sia sphe	eres	ha	ving an	approxi	mate	e diameter of			
TUG LOCATION: ACCESSIBILITY LRU												
Intertank and Aft Adapter	. 1	Inadeq				Yes						
LIFE DATA												
OPERATION LIFE:			SHELF LIF	E:		MTBR						
3,400 Hrs. 20	CYCL	ES	ite		(Desig	6,720 Hrs.						
NO, TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED: 18 2.5 SPARES REQUIRED: 1 Ship Set												
MAINTENANCE DATA						·						
1 1	111			SC	HD	UNSCHE	PRIMARY	Y TĘC	CHNIQUE			
MAINTENANCE LEVEL X		MAIN TYPE	TENANCE	х		х	Condi	tion	- Monitoring			
OFIREQUIREMENTS: Pressure transducer												
MAINTENANCE FUNCTIONS: 1. SCHEDULED MAINTENANCE a. Review flight OFI i b. Visual inspection of perform leak test. 2. UNSCHEDULED MAINTENANC a. If the flight OFI of evidence of perform	f hel	videnc lium s EVEL I or vis	pheres f () (ual insp	or e	ević ion/	lence o	f strruc	tura cts	l damage, and a failure or			
OTHER CONSIDERATIONS REMAR	KS											
None												

MAINTENANCE ITEM DATA	A					 -					
ITEM IDENTIFICATION:						Т	ABLE	5-1 RE	:	FUN	ICTION NO.
Pressurization Sol	eno:	id C	ont	rol Va	alve		Iten	n 40		2.	1, 2.10, 2.11
									1710011		& 3.1
SYSTEM:		- {		SYSTEN				I CF	RITICALIT	Υ:	
Propulsion					ization				4	_	
FUNCTIONAL DESCRIPTIO valves contained in	N: P	rovi e pr	des	pneur uriza	natic pro	essure system	e for	cont:	rol pne	umat	ic actuated
PHYSICAL DESCRIPTION:	ТВ	S									
TUGLOCATION: Aft Skir	Tug Location Aft Skirt and ACCESSIBILITY										· · · · · · · · · · · · · · · · · · ·
Aft Adapter Adequate									Ye	s	
LIFE DATA											
OPERATION LIFE:			FE:	MTBF 4,000 Hrs.				MTBR			
3,400 Hrs. 20 Indefinite CYCLES									Goal)		6,720 Hrs.
NO. TIMES REFURBISHAB		ANTICI	FURB/1	00 FL	IGHTS	SPARE	SRE	QUIRED:			
18		.5			TBD						
MAINTENANCE DATA											
	1	11	111	<u> </u>		SCHI	CHD UNSCHO PRIMARY TECHNIQUE				
MAINTENANCE LEVEL	х	x		MAIN	TENANCE	x		х	Condit	ion	- Monitoring
OFI REQUIREMENTS:											
Continious current	sign	atui	еπ	onito	ring for	each	acti	uation	during	£1:	ight operation.
MAINTENANCE FUNCTION	IS:										
Same as item 15											
1											
OTHER CONSIDERATIONS	/D.C.N	4 A D V				···	<u></u>		······		
}	/ IN E!V	MAK	Ş								
None											

MAINTENANCE ITEM DATA				······································					•		
ITEM IDENTIFICATION:	`				TA	BLE 5-1	REF	· .	FUN	CTION NO.	
	ъ.						- م	,,,	2.	1, 2.10,	2.11
Pressurization Heli	um Keg	gulai	tor		1	em 41				& 3.1	
SYSTEM:		SUE	SYSTEM	i·			CR	ITICALIT	Υ:		
Propulsion		P	ressuri	zation				4			
FUNCTIONAL DESCRIPTION spheres at appropri	N: Pro ate 1	ovide evel:	es outp s for p	out press ourge and	sure re	egulat: essur:	ion izat	from the	he h	elium st	orage
PHYSICAL DESCRIPTION:	TBS										
TUG LOCATION:			ACCESS	BILITY				LRU			
Intertank and Aft Ad				Yes							
LIFE DATA						1					
OPERATION LIFE:		=E:	MTBF 4.0		MTBR	11					
3,400 Hrs.	nite	e 4,000 Hrs. (Design Goal)					Hrs.				
NO. TIMES REFURBISHAB	LE		ANTIC	PATED REI)0 F L ! G !	QUIRED:				
18				2.	. 5			T	BD		
MAINTENANCE DATA					,						
	1 1	! !!!	-		SCHD	UNSC	CHNIQUE				
MAINTENANCE LÉVEL	X		MAIN	TENANCE	х	х		Condit	ion	- Monito	ring
OFIREQUIREMENTS: Pressure Transducer MAINTENANCE FUNCTION 1. SCHEDULED MAINTE a. Review flight b. Perform leaks 2. UNSCHEDULED MAIN a. If flight OFI evidence of p and perform 1	IS. ENANCE OFI age te ITENAN data berfor	(LE data st a CE (or manc	VEL I) for ever a sapart LEVEL I the rese	vidence of the I)	of fai syste the 1	m leak eak te	te st	st. indicat	e fa	ailure or	
OTHER CONSIDERATIONS	REMA	RKS				<u> </u>					
None											

MAINTENANCE ITEM DATA												
ITEM IDENTIFICATION:	 		TAE	BLE 5-1 RE	F:	FUNCTION NO.						
Helium Filter			I	tem 42		2.1, 2.10, 2.11 & 3.1						
SYSTEM:	SUBSYSTE	M:		С	RITICALIT	TY:						
Propulsion	Pressur	rizatíon			4							
FUNCTIONAL DESCRIPTION: Pro- prevent introduction of co- pneumatic subsystems.						lium spheres to r into the purge and						
PHYSICAL DESCRIPTION:												
TBS												
TUG LOCATION: ACCESSIBILITY LRU												
Intertank and Aft Adapter	Ac			Yes	«							
LIFE DATA												
OPERATION LIFE:		FE;	MTBF		MTBR							
1,320 Hrs. TIME 5	CYCLES	Lte	1,320	Hrs.	After 5 Flights							
NO. TIMES REFURBISHABLE	ANTI	FURB/100	FLIGHTS	S REQUIRED:								
3 20 TED												
MAINTENANCE DATA												
1 11	1111		SCHD	UNSCHO	PRIMARY	Y TECHNIQUE						
MAINTENANCE LEVEL	MAI TYP	NTENANCE E			ime							
OFI REQUIREMENTS:			l _X	X	т	Tille						
None												
MAINTENANCE FUNCTIONS:												
1. SCHEDULED MAINTENANCE a. After every 5th fli 2. UNSCHEDULED MAINTENANC a. Any time the helium and replace the fil	ght remove E (LEVEL pressure	ve and rep I) e system :	is open	ed for n	naintena	ince purposes, remove						
OTHER CONCIDERATIONS (DEALS)	K.C.			····								
OTHER CONSIDERATIONS/REMAR None	CA											
<u></u>												

·····			~									· · · · · · · · · · · · · · · · · · ·
MAINTENANCE ITEM DAT	Α				·					1		
ITEM IDENTIFICATION:								3LE 5-1 R				ICTION NO.
Helium Vent Valve							I	tem 43	& 7	75	۷.	.1, 2.10, 2.11 & 3.1
SYSTEM:			SUE	SYSTEN	1 :			1	CRI	TICALIT	Υ:	
Propulsion			Pı	ressur	ization					_	4	
FUNCTIONAL DESCRIPTION	N:	Prov	ide	es hel:	ium vent:	ing	capa	ability	ir	the o	ever	nt of helium
system overpressure	or	fai	.luı	re of t	the heli	um p	res	sure re	gu]	lators.	•	
PHYSICAL DESCRIPTION:												
	T	BS										
TUG LOCATION:				ACCES	SIBILITY					LRU		
Intertank and Aft A	Ade					Yes						
LIFE DATA								· · · · · · · · · · · · · · · · · · ·				
OPERATION LIFE:		FE:	MTBF 4,000 Hrs.				MTBR					
3,400 Hrs.	3,400 Hrs. 20 Indefinite CYCLES									:s.		6,720 Hrs.
NO. TIMES REFURBISHAB	L.E			ANTIC	PATED RE		3/100	FLIGHT	s	SPARES		QUIRED:
18 2.5 TBD												
MAINTENANCE DATA	·········					· · · ·		T				
		11	111	- -i			HD	UNSCHE) PI	RIMARY	TEC	CHNIQUE
MAINTENANCE LEVEL	Х	X		TYPE	TENANCE	,	X	х		Condi	ior	- Monitoring
OF REQUIREMENTS:								-				
Proximity pickup												
MAINTENANCE FUNCTION	NS:							····				
Same as item 17												
OTHER CONSIDERATIONS	REM	IARK	S			-						
None		41114										
-,												

MAINTENANCE ITEM DATA												
ITEM IDENTIFICATION:			TAE	LE 5-1 RE	F:	FUNCTION NO.						
Helium Quick Disconnect			I	tem 44,7	6 & 80	2.1, 2.7 & 3.1						
SYSTEM:	SUBSYSTEM	Λ:		С	RITICALIT	ΓΥ:						
Propulsion	Pressuri	ization			4							
FUNCTIONAL DESCRIPTION: Prov	ides grou	nd operat	ions co	onnectio	ns for	the purpose press-						
urization of the helium s	pheres.											
PHYSICAL DESCRIPTION:												
TBS												
TUG LOCATION: ACCESSIBILITY LRU												
Aft Skirt	Ade			Yes								
LIFE DATA												
OPERATION LIFE:		SHELF LIF		MTBF 4,000	Hrs.	MTBR						
3,400 Hrs. 20	CYCLES	te ———	(Design	6,720 Hrs.								
NO. TIMES REFURBISHABLE	ANTIC			B/100 FLIGHTS SPARES REQUIRED:								
18		· · · · · · · · · · · · · · · · · · ·	2.5		T	BD						
MAINTENANCE DATA				1								
1 11	- 		SCHD	UNSCHD	PRIMARY	/ TECHNIQUE						
MAINTENANCE LEVEL X	TYPE	ITENANCE	х	х	On -	Condition						
OFI REQUIREMENTS:			***									
None												
MAINTENANCE FUNCTIONS:	<u> </u>											
Same as item 21												
Same as Item 51												
}												
1												
OTHER CONSIDERATIONS/REMAR	KS											
None												

MAINTENANCE ITEM DATA	^:						_								
ITEM IDENTIFICATION:							TAE	LE 5-1 F	REF:	i i	FUNC	CTION NO.			
Helium Coupler							I	tem 45			2.1	L, 2.7 &	3.1		
SYSTEM:			SUE	SYSTEM	A:		1		CRI	TICALITY	Y:				
Propulsion			Pr	ressur	ization					4					
FUNCTIONAL DESCRIPTION Helium Fill and ven	N: ;	Prov ervi	ide .ce	es inte	erface co	onne	ctio	on cap	abi:	lity fo	r th	ne orbit	er		
PHYSICAL DESCRIPTION:															
	TB	S													
TUG LOCATION				ACCES	SIBILITY					LRU					
Aft Adapter				Adeo	quate					Yes					
LIFE DATA															
OPERATION LIFE:	20				SHELF LI		-	4 ,7 6 60			r	MTBR			
3,400 Hrs.	CYC	LES	Indefin	ite		(Desi	gn (Goal)		6,720	Hrs.				
NO. TIMES REFURBISHABI			PATED RE	FURE	3/100	FLIGH	rs	SPARES	REQ	UIRED:					
18			2.	. 5				1 Shi	p Se	t .					
MAINTENANCE DATA															
		11	111	→		SC	SCHD UNSCHD PRIMARY TECHNIQUE								
MAINTENANCE LEVEL				MAIN TYPE	ITENANCE :					_					
OFI REQUIREMENTS:	X	<u> </u>	<u> </u>	1		<u>X</u>		X		On - C	ond i	tion			
None															
MAINTENANCE FUNCTION	IS:							777		····	,				
Same as item 19															
OTHER COMMING BATIONS	0.51	4 A 🖽 ::						· · · · · · · · · · · · · · · · · · ·							
OTHER CONSIDERATIONS	∺⊦N	ланк	.5												
None															
,															

MAINTENANCE ITEM DAT	Α										
ITEM IDENTIFICATION:					TAI	BLE 5-1	REF:	FU	INCTION NO.		
Helium Plumbing					I	tem 46		2	2.1, 2.7 &	3.1	
SYSTEM:		SL	BSYSTEN	Λ:			CRI	TICALITY:			
Propulsion		Pı	essuri	zation				4			
FUNCTIONAL DESCRIPTIO	N:										
Same as Item 37											
PHYSICAL DESCRIPTION:											
TUG LOCATION:			ACCES	SIBILITY				LRU			
LIFE DATA									·		
OPERATION LIFE:				SHELF LI	FE:	MTBF			MTBR		
TIME		cv	CLES								
NO, TIMES REFURBISHAB	LF	<u> </u>		I IPATED RE	FURB/100	LLLGH DELIGH	TS	SPARES R	EQUIRED:		
NO. TIMES HE DISTANCE			AN TO	II A I CO II C	101107100	J . L. G.,	1.5	0.711120 11			
AAANTENIANOE DATA			<u></u>		//			<u> </u>			
MAINTENANCE DATA					SCHD	LINICC	1D P	BIMARY TE	CHNIQUE		
MAINTENANCE				ITENANCE	ŀ	SCHD UNSCHD PRIMARY TECHNIQUE					
LEVEL			TYPE								
OFI REQUIREMENTS:	!L_			<u></u>		-!		<u>.</u>			
OFT REGULATION.											
MAINTENANCE FUNCTION	NS	<u>-</u> -									
OTHER CONC.DERATIONS		DVC			· 						
OTHER CONSIDERATIONS	ort, WA	ピルバン									
		1-41									

不是一个人,我们也不是一个人,也是一个人的,我们也是一个人的,我们也是一个人的,我们也是一个人的,我们也会一个人的,我们也是一个人的,我们也会一个人的,我们也会 第一个人的,我们也是一个人的,我们也是一个人的,我们也是一个人的,我们也是一个人的,我们也是一个人的,我们也是一个人的,我们也是一个人的,我们也是一个人的,我们

NASS 31011 8-74 (PRELIMINARY)

MAINTENANCE ITEM DATA	Α										
ITEM IDENTIFICATION:							TA	BLE 5-1 RE	F:	FUI	NCTION NO.
Actuator Assembly							I	tem 48	_	2	.10, 2.11, 3.1, 4.18 & 4.43
SYSTEM:		;	SUE	SYSTER	Л:		-	CI	RITICALIT	Υ <u>:</u>	
Propulsion			Ну	draul	ica					4	
FUNCTIONAL DESCRIPTION	N: T	he a	eti	iai or a	assembli	≘s p	rov	ide pitc	h and y	aw (control during
main engine firing, at a rate of 5°/ se	, Wi	th a	to	otał g:	imbal cap	pabi	lit	y of <u>+</u> 5	o inclu	din	g 1° snubbing,
PHYSICAL DESCRIPTION:			_					1			
	TB	S									
TUG LOCATION.				ACCES	SIBILITY				LRU		
Aft Skirt				Ade	quate				Yes		
LIFE DATA											
OPERATION LIFE:					SHELF LII	FE:		МТВF 4,000 Н	rc		MTBR
3,400 Hrs.	2	0 0	YC	LES	Indefin	ite		(Design			2,800 Hrs.
NO. TIMES REFURBISHAB	LE			ANTIC	PATED RE	FURE	100	FLIGHTS	SPARE	SRE	QUIRED:
10					6.0				1 Sh	ip	Set
MAINTENANCE DATA						· · · · · ·					
	_	li l	111			\$C	HD	UNSCHD	PRIMARY	/ TE	CHNIQUE
MAINTENANCE LEVEL	х	x		TYPE	TENANCE		X	x	Condite	đ. a. a.	- Monitorino
OFI REQUIREMENTS:				4-,		L	Λ		CORGIC.	TOIL	- Monitoring
Appropriate transduc	ers	for	CC	mmand	response	∍, g	imba	al rate,	positi	on a	and acceleration.
					···						
MAINTENANCE FUNCTION		an 7:	. 171	ma TN							
1. SCHEDULED MAINTE a. Review flight					vidence d	nf p	er fo	ormance	degrada	tio	or failure in
redundant cir						r			6		
b. Perform funct				_		ing	•				
2. UNSCHEDULED MAIN a. If OFI flight						30 T	ema:	ve and r	an1ana	tha	actuator
assembly, per										CHE	actuator
3. UNSCHEDULED MAIN	ITEN	ANCE	(I	EVEL :	II)						
a. Repair malfun storage.	cti	oned	ac	tuato	r assembl	ly a	s a	pplicabl	e, test	, a	nd return to
OTHER CONCURED ATIONS	DEM	11000									
OTHER CONSIDERATIONS None	ι C iΛ	MN.	3								
Hone											
]											

MAINTENANCE ITEM DATA	7										
ITEM IDENTIFICATION:						TA	ABLE 5-1 F	REF:	FUN	ICTION NO.	
Main Hydraulic Pump							Item 49		2.	.10, 2.11	& 3.1
SYSTEM:		\Box	SUB	SYSTEN	Λ:			CRITICALI	TY:		
Propulsion			Ну	draul:	ic 			4	ŀ		
FUNCTIONAL DESCRIPTION ine firings.	N: P	rovi	des	hydra	aulic pov	ver to	the TV	C actuato	rs	luring mai	n eng-
PHYSICAL DESCRIPTION:											
	ТВ	S									
							.			-···	
TUG LOCATION:					SIBILITY			LRU			
Intertank				Ade	quate			Yes	3		
LIFE DATA					,						
OPERATION LIFE:	_	_			SHELF LI		¥,7650			MTBR	
3,400 Hrs.	2	0 (CYC	LES	Indefin	ite	(desi	gn goal)		6,720	Hrs.
NO. TIMES REFURBISHAB	LE			ANTIC	PATED RE	FURB/1	00 FLIGH	rs SPAR	SRE	QUIRED:	
18					1.0			TI	BD.		
MAINTENANCE DATA									•		
	1	11	111	1		SCHD	UNSCH	PRIMAR	Y TE	CHNIQUE	
MAINTENANCE LEVEL	x	х		TYPE	TENANCE	x	x	Condit	ion	- Monitor	ing
OFI REQUIREMENTS; Pressure transducer	on	the	οι	itput (of the p	ump as	sembly,	and flow	ı ra	te measure	ments.
MAINTENANCE FUNCTION				\							
1. SCHEDULED MAINTE a. Review flight				_	ce of far	ilure	or perf	ormance o	legr	adation.	
b. Perform funct	ion	al t	est	ing.			F		0-	:	
2. UNSCHEDULED MAIN			•		-		6		. د م د		د ـ
a. If OFT flight replace pump									acı	on, remove	and
3. UNSCHEDULED MAIN											
a. Repair pump a	sse	mb1y	as	s appl	icable,	te s t a	nd retu	rn to sto	orag	e.	
											
OTHER CONSIDERATIONS	/REN	ARK	S								
None											

MAINTENANCE ITEM DATA	Δ													
ITEM IDENTIFICATION:							TAB	LE 5-1 I	REF:		FUN	CTION NO.	•	
Auxiliary Hydrauli					Ιt	em 50			2.	.10, 2.11 & 3.	. 1			
SYSTEM:		1	SUB	SYSTEN	1:				CRI	TICALIT	Υ;			
Propulsion			Ну	drauli	Lc					4				
FUNCTIONAL DESCRIPTION	N: P	rovi	des	hydra	aulic pre	ssu	re i	for ac	tuat	ors d	urin	ng low thrust		
main engine firings	, a	nd p	rov	ides t	oackup fo	e m	ain	pump.						
PHYSICAL DESCRIPTION:						*****							·	
PH ISIONE DESCRIPTION.		1	BS											
TUG LOCATION:			-	ACCES	SIBILITY					LRU				
Intertank					quate						es			
LIFE DATA			1							L				
OPERATION LIFE:		•	E:		мұт, в бо	O Hr	s.		MTBR					
3,400 Hrs.	CYC	LES	ite		(Desi				6,720 Hrs.					
NO, TIMES REFURBISHABI			FURE	/100	FLIGH	TS	SPARE	SRE	QUIRED:					
18			ļ		1.0)				•	TBD			
MAINTENANCE DATA										-1				
	1	11	111			7.0	HD	UNSCH	D PI	RIMARY	/ TEC	CHNIQUE		
MAINTENANCE LEVEL				MAIN	TENANCE					,				
OFI REQUIREMENTS:	X	X	<u> </u>	<u>L.</u>			<u>X</u>	X	<u> </u>	Condit:	ion	- Monitoring		
Same as item 49, pl	us (curr	ent	signa	ature for	p u	mp n	notor.						
				_		-	-							
MAINTENANCE FUNCTION	IS:		,											
Same as item 49														
OTHER CONSIDERATIONS	REN	/ARK	S				-							
None														
						5.0								

MAINTENANCE ITEM DATA	\		_									
ITEM IDENTIFICATION:							TAB	LE 5-1	REF:			ICTION NO.
Hydraulic Check Val	ve						Ιtε	em 51			2	2.10, 2.11, 3.1 & 4.43
SYSTEM:		16	SUB	SYSTEM	1:				CRI	TICALIT	Υ:	
Propulsion			H	ydraul	.ic					4		
FUNCTIONAL DESCRIPTION	V: P	rovi	ide	s hydr	aulic fl	luid	f1c	ow dire	ecti	ion as	fur	ction of which
hydraulic pump is o	pera	ting	g.	-								
PHYSICAL DESCRIPTION:								,				
	TBS	j										
TUG LOCATION:				ACCES	SIBILITY					LRU		
Intertank and Aft S	kirt			Ađe	quate					Yes		
LIFE DATA												
OPERATION LIFE:					SHELF LIF	FE:		MTBF 4,00	О Н1	rs.		MTBR
3,400 Hrs. TIME	20	C	YC	LES	Indefin	ite		(Desi				6,720 Hrs.
NO. TIMES REFURBISHABI	_E			ANTIC	PATED REF		/100	FLIGH	TS	SPARE	SRE	QUIRED:
18					1.	.0				TBI	D	
MAINTENANCE DATA			_									
		-11	111			SCI	HD.	UNSCH	D P	RIMARY	/ TE(CHNIQUE
MAINTENANCE LEVEL	Х	X		TYPE	TENANCE	х		х	(Condit	ion	- Monitoring
OFI REQUIREMENTS:								•				
Proximity pickup to	det	erm	ine	: valve	positic	on di	urit	ng pum	p o	perati	ons.	•
MAINTENANCE FUNCTION	 S:			·								
1. SCHEDULED MAINTE												
a. Review flight	OFI	. da	ta	to det	ermine f	if a	fä	ilure	or	per for	mano	e degradation
has occured. b. Functional te	st a	ıs a	pa	rt of	the TVC	Sys	tem	leve1	te	st.		
2. UNSCHEDULED MAIN	TENA	NCE	(I	EVEL]	I)	-						
a. If an anomaly and performan				ed ren	nove and	rep	lace	e the	val	ve, pe	r foi	m leak test
3. UNSCHEDULED MAIN				EVEL :	II)							
a. repair valve	as a	pp1	ica	ible, t	est and	ret	ırn	to st	ora	ge.		
					** <u>*****</u>				<u> </u>			
OTHER CONSIDERATIONS	/REM	ARK	S									
None												
ĺ												

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MAINTENANCE ITEM DATA	1										
ITEM IDENTIFICATION:				***		TA	BLE 5-1	REF:	**		ICTION NO.
Solenoid Sequence V	alve	9					Item 52				2.10, 2.11, 3.1 & 4.43
SYSTEM:		T	SUE	SYSTEM	1:	<u></u>	-	CRIT	TICALIT	ΓY:	
Propulsion			F	lydraul	ic				4		
FUNCTIONAL DESCRIPTION	V: 1	Prov	ide	s acti	ation pr	ressure	e for a	11 p	neuma	tic	actuated valves
in proper sequence											
											· · · · · · · · · · · · · · · · · · ·
PHYSICAL DESCRIPTION:	T	3 S									
TUG LOCATION:	•			ACCES	SIBILITY				LRU		
Intertank and Aft S	kir	t		ł	luate				Yes		
LIFE DATA		 -		<u> </u>							
OPERATION LIFE:					SHELF LI	FE:	MTBF				MTBR
	^				- 1- c.	• • -	4,00				6 700 11
3,400 Hrs. TIME 2			YC	LES	Indefini		(Desi			SRE	6,720 Hrs QUIRED:
18				ANTIO	2.5	0110/10	o i Eldii	.	TB		,
MAINTENANCE DATA	<u> </u>										
MAINTENANCE DATA	ı	11	111	T		SCHD	UNSCH	ID PF	RIMARY	Y TE	CHNIQUE
MAINTENANCE LEVEL	x	х		MAIN	TENANCE	х	х		ondit	ion	- Monitoring
		L					<u> </u>				- Hourtoning
OFI REQUIREMENTS:	ad							*		~ C	11-1
Continious current	2T Å1	iia Lu	IE	monic	oring to	eacn	actuat	TOIT	ant in	g r	right operation.
MAINTENANCE FUNCTION	 IS:										
Same as item 15											
									•		
OTHER CONSIDERATIONS:	REM	1ARK	.\$								
None											

MAINTENANCE ITEM DATA	4							
ITEM IDENTIFICATION:					TAE	LE 5-1 REF	:	FUNCTION NO.
High Pressure Relie	f Va	lve.				Etem 53	ļ	2.10, 2.11, 3.1 & 4.43
SYSTEM:		S	JBSYST	EM:		CR	ITICALIT	ΓY:
Propulsion			Hydrau	ılic.			4	
FUNCTIONAL DESCRIPTIO system pressure exc PHYSICAL DESCRIPTION:	N: P eeds TB	the	des hi safe	gh pressur upper limi	ce relie	ef in the	e event	the hydraulic
TUG LOCATION: Intertank			1	ESSIBILITY lequate			LRU Y	es
LIFE DATA						······································		
OPERATION LIFE:				SHELF LI		147,5500 E		MTBR
3,400 Hrs.	20	C	CLES	Indefin	ite	(Design	Goal)	6,720 Hrs.
NO. TIMES REFURBISHAB	L.E		ANT	ICIPATED RE		FLIGHTS	SPARE	S REQUIRED: D
MAINTENANCE DATA						<u></u>		
	1	Ш	11		SCHD	UNSCHD	PRIMAR	Y TECHNIQUE
MAINTENANCE LEVEL	х	х		AINTENANCE 'PE	х	х	Condit	ion - Monitoring
MAINTENANCE FUNCTION 1. SCHEDULED MAINTE a. Review flight degradation. b. Verify relief 2. UNSCHEDULED MAIN a. Remove and redegradation, 3. UNSCHEDULED MAIN a. Repair failed	IS: NANC OFI Val TENA plac veri	E (L for ve s NCE e re	EVEL I indice the point of the	I) cations of int and ope L I) valve if O set point a	improperation FI indicand oper	er valve cates fairation.	operat	ion or performance or performance
OTHER CONSIDERATIONS None	/REM	ARKS						

MAINTENANCE ITEM DATA										
ITEM IDENTIFICATION:			'		T.	ABLE 5-1	REF:	- "		CTION NO.
Low Pressure Relief	Valve				I	tem 54				2.10, 2.11, 3.1 & 4.43
SYSTEM:		SUE	SYSTEM	l:			CRI	TICALIT	Υ:	
Propulsion		Ну	ydrauli	c				4		
FUNCTIONAL DESCRIPTION volume is exceeded.	Prov	ides	soverb	oard rel	ief o	f hydra	ulic	: fluid	l wh	en reservoir
volume is exceeded.										
PHYSICAL DESCRIPTION:	TBS									
1										
TUG LOCATION:			ACCESS	BILITY				LRU		
Intertank and Aft Sk	irt		Adeq	uate				Yes		
LIFE DATA										AATOO
OPERATION LIFE:				SHELF LIF	FE:	MTBF 4,00	0 Hc	ours		MTBR
	20	CYC	LES	Indefin		(Desi				6,720 Hrs.
NO. TIMES REFURBISHABLE 18	E		ANTICI	PATED REF 2.5		00 FLIGH	TS	SPARES	TBI	QUIRED:
MAINTENANCE DATA			<u> </u>							
	1 11	111			SCH	D UNSCH	4D PI	RIMARY	TE(CHNIQUE
MAINTENANCE LEVEL	x x		MAIN	TENANCE	х	х	C	Conditi	ion	- Monitoring
OFI REQUIREMENTS:										
Same as item 53										
MAINTENANCE FUNCTIONS	S:									
Same as item 53										
OTHER CONSIDERATIONS	REMAF	RKS				· · · · · · · · · · · · · · · · · · ·				
None										
1										

MAINTENANCE ITEM DAT	Α									
ITEM IDENTIFICATION:					7	ГАВ	LE 5-1 RE	F:	FU	NCTION NO.
Hydraulic Bleed Va	ılve						Item 55			2.7 & 3.1
SYSTEM:			SUE	BSYSTEM:			С	RITICALI	TY:	
Propulsion			ŀ	Hydraulic				L	+	
FUNCTIONAL DESCRIPTIO capability.	N:	Prov	ide	es ground opera	tion	s h	ydrauli	c syste	=m b	leed and sample
PHYSICAL DESCRIPTION:										
	Т	BS								
	···									
TUG LOCATION:				ACCESSIBILITY				LRU		
Intertank				Adequate				Ye	es	
LIFE DATA										
OPERATION LIFE:				SHELF LIF	E:		MTBF	••		MTBR
3,400 Hrs. TIME	20	C	YC	LES Indefini	te		4,000 (Design			6.720 Hrs.
NO. TIMES REFURBISHAB				ANTICIPATED REF					SRE	QUIRED:
18				1.	0			1	BĐ	• *
MAINTENANCE DATA		_		<u> </u>			<u> </u>			
	l.	11	Ш		SCH	D	UNSCHD	PRIMAR	Y TE	CHNIQUE
MAINTENANCE LEVEL	х	х		MAINTENANCE TYPE	х		х	0n =	Con	dition
OFI REQUIREMENTS:	l,	1					·	<u> </u>		
MAINTENANCE FUNCTION 1. SCHEDULED MAINTE a. Visual inspectmental control 2. UNSCHEDULED MAIN	NS: ENAN Etio	CE (n fo	LEV	VEL I) evidence of val LEVEL I)	lve 1	ral	cage and	l prope		
a. Remove and re 3. UNSCHEDULED MAIN a. Repair valve storage.	YTEN	ANCE	()	LEVEL II)						
OTHER CONSIDERATIONS	YREN	MARK	S				<u></u>		·	
This valve may be	inex	pens	iv	e and will not	just	ify	y repair	.		

MAINTENANCE ITEM DATA	· · · · · · · · · · · · · · · · · · ·							
ITEM IDENTIFICATION:	· · · · · · · · · · · · · · · · · · ·		TAE	BLE 5-1 REF	= ;	FUNCTION N	0.	
Hydraulic Filter Assembl	у		I1	tem 56		2.10 & 3	3.1	
SYSTEM:	SUBSYSTE	M:		CF	RITICALIT	Y:		
Propulsion	Hydrau	lic			4			
FUNCTIONAL DESCRIPTION: Prov	ides filt	ering on	the out	tput of	the hydr	aulic pum,	s to	
prevent introduction of c	ontaminat	es into t	he actu	uator as:	sembly.			
PHYSICAL DESCRIPTION:	TBS							
TUG LOCATION:	ACCES	SIBILITY			LRU			
Intertank and Aft Skirt	Ađe	quate			Yes			
LIFE DATA								
OPERATION LIFE:		SHELF LIF	E:	MTBF		MTBR		
1,320 Hrs, TIME 5	CYCLES	Indefin	ite	1,32	O Hrs.	After	5 Flights	
NO, TIMES REFURBISHABLE	ANTIC	IPATED REF		FLIGHTS	SPARES	RES REQUIRED:		
3			0			T3D		
MAINTENANCE DATA	177.1			Lucaria	DOIMA ON	TECHNIQUE		
MAINTENANCE	III MAII	NTENANCE	SCHD	UNSCHD	PHIMAR	TECHNIQUE		
LEVEL X	TYPI		Х	х	Tin			
OFI REQUIREMENTS:								
None								
MAINTENANCE FUNCTIONS:								
1. SCHEDULED MAINTENANCE	(LEVEL I	3						
a. After every 5th fl	ight remo	ve and re	place t	the filt	er assem	bly.		
2. UNSCHEDULED MAINTENANG a. Any time the hydra			ned for	r nurnos:	es of ma	intenance	removė	
and replace the fi					01 me			
OTHER CONSIDERATIONS/REMAR	KS			<u> </u>				
None								

į

MAINTENANCE ITEM DATA												
ITEM IDENTIFICATION:				TA	BLE 5-1 F	EF:	FUNCTIO	N NO.				
Hydraulic Plumbing				_ 1	tem 57		2.7,	2.10 & 3.1	1			
SYSTEM:	SUE	SYSTEM	1 :			CRITICALI	ΓY:					
Propulsion		ydrauli					4					
FUNCTIONAL DESCRIPTION system.	: Provide:	s all	the hydr	aulic	fluid 1	ines in	support	of the TVC	J _			
PHYSICAL DESCRIPTION:												
ТВ	S											
TUG LOCATION:		ACCES	SIBILITY			LRU	· · · · · · · · · · · · · · · · · · ·	,				
Intertank and Aft Sk	irt	Adeo	quate			No			****			
OPERATION LIFE: SHELF LIFE: MTBF MTBR												
OPERATION LIFE:			ĺ	-E;	1	• / 4	IMTE					
3,400 Hrs. TIME 20	CYC	LES	N/A		<u> </u>	I/A 		N/A 				
NO. TIMES REFURBISHABLE	Ē	ANTIC	PATED REF	URB/10	0 FLIGHT	S SPARE	S REQUIS	ED:				
N/A				No								
MAINTENANCE DATA												
	1 11 111			SCHD	UNSCH	PRIMARY	Y TECHNII	QUE				
MAINTENANCE LEVEL	x	TYPE	TENANCE	х	х	On -	Condit	ion				
OFI REQUIREMENTS:												
None												
MAINTEN ANDE ELMOTIONS		1	·									
MAINTENANCE FUNCTIONS	i:											
Same as item 33												
							···					
OTHER CONSIDERATIONS/F	REMARKS											
None												
												

MAINTENANCE ITEM DATA											
ITEM IDENTIFICATION:			TABLE 5-1	REF:	FUNCTION NO.						
${ t LO}_{f 2}$ and ${ t LH}_2$ Capacitive Ma	iss Probe		Items 59	& 60	2.10, 2.11 & 3.1						
SYSTEM:	SUBSYSTEM:	· . · · · · · · · · · · · · · · · · · ·		CRITICALIT	Y;						
Propulsion	Propellant 1	Load & Me	asuring	3							
FUNCTIONAL DESCRIPTION: Pro the propellant tanks duri					LO ₂ and LH ₂ in						
PHYSICAL DESCRIPTION: TBS											
TUG LOCATION: ACCESSIBILITY LRU											
LO2 & LH ₂ Tanks Inadequate LO ₂ Tank Yes											
LIFE DATA											
OPERATION LIFE: SHELF LIFE: MTBF MTBR											
4,000 Hrs. TIME 20 CYCLES Indefinite (Design Coal) (5.720 Hrs.											
3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs. NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED:											
18 2.5 TBD											
MAINTENANCE DATA											
1 1)	111	SC	HD UNSCH	D PRIMARY	' TECHNIQUE						
MAINTENANCE X	X TYPE	ANCE	Х	Condit	ion - Monitoring						
OFIREQUIREMENTS: Baseline identified OFI is adequate MAINTENANCE FUNCTIONS: 1. SCHEDULED MAINTENANCE (LEVEL I) a. Review flight OFI data for evidence of failure or performance degradation. b. Verify probe calibration. 2. UNSCHEDULED MAINTENANCE (LEVEL I) a. Remove and replace mass probe and perform system calibration. 3. UNSCHEDULED MAINTENANCE (LEVEL III) a. Return mass probe to vendor for repair and calibration, then return to											
other considerations/remarks None											

MAINTENANCE ITEM DATA											
ITEM IDENTIFICATION:					TAE	BLE 5-1 RE	F:)	ICTION NO.		
LO2 and LH2 Control	Assem	blie	es		Ite	ems 61 &	62	2	2.10, 2.11, 3.1 & 4.21		
SYSTEM:		SUE	SYSTEM	1:		С	RITICALI	TY:			
Propulsion		Pro	pellan	t Load &	k Measu	ring	4				
FUNCTIONAL DESCRIPTION measurements of the											
PHYSICAL DESCRIPTION:	'IBS										
TUG LOCATION:			ACCESS	SIBILITY			LRU				
Intertank Adequate Yes											
LIFE DATA											
OPERATION LIFE:				SHELF LII	FE:	14TBF 4,000	Hrs.		MTBR		
3,400 Hrs. TIME	20	O CYCLES Indefinite (Design Goal) 6,720 Hrs.									
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED: 18 2.5 TBD											
MAINTENANCE DATA											
	1 11	111	 		SCHD	UNSCHD	PRIMAR	Y TEC	CHNIQUE		
MAINTENANCE LEVEL	x x		TYPE	ITENANCE	х	х	Condit	ion	- Monitoring		
MAINTENANCE FUNCTIONS 1. SCHEDULED MAINTE a. Review Flight b. Perform syste 2. UNSCHEDULED MAIN a. Remove and re 3. UNSCHEDULED MAIN a. Repair failed calibration.	ENANCE OFI OFI TENAN OPIACE OTENAN I asse	dat ibr CE Ea CE mbl	a for eation. (LEVEL iled as (LEVEL y as ap	evidence I) ssembly II) pplicabl	and per	form sys	stem cal	libra	ation.		
OTHER CONSIDERATIONS/ None											

以外,不是一种的一种,是一种的一种,是一种的一种,是一种的一种,是一种的一种,是一种的一种,是一种的一种,是一种的一种,是一种的一种,是一种的一种,是一种的一种,

MAINTENANCE ITEM DAT	A										
ITEM IDENTIFICATION:						T.	ABLE 5.	REF			ICTION NO.
Power Supply						I	item 63	ı			2.10, 2.11, 3.1 & 4.21
SYSTEM:			SUE	SYSTEM	1:			CR	TICALIT	ΓY:	
Propulsion			Pro	pe11ar	t Load 8	& Meas	uring		4		
FUNCTIONAL DESCRIPTIO	N:	Prov	ide	s oper	ating po	ower f	or the	con	trol a	sser	mblies.
PHYSICAL DESCRIPTION: TBS											
TUG LOCATION: ACCESSIBILITY LRU											
Intertank Adequate Yes											
LIFE DATA											
OPERATION LIFE: SHELF LIFE: MTBF 4,000 Hrs. 4,000 Hrs. 4,000 Hrs. 4,000 Hrs.											
	3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs.										
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED: 2.5 TBD											
MAINTENANCE DATA											
MAINTENANCE	-	11	<u></u>								CHNIQUE
MAINTENANCE LEVEL	x	х		TYPE	TENANCE	х	х		Condi	tion	n - Monitoring
OFIREQUIREMENTS: Same as item 59 MAINTENANCE FUNCTION	JS-										
Same as item 61	10.										
OTHER CONSIDERATIONS	REN	/ARK	S								
None											

												
MAINTENANCE ITEM DATA	<u> </u>								1 =			
ITEM IDENTIFICATION:							LE 5-1 RI	EF:		ACTION NO. 2.10, 2.11, 3.1		
Point Level Sensor						Ιt	em 64		<u> </u>	& 4.21		
SYSTEM:		SUE	SYSTEM	1:			(CRITICALI	TY:			
Propulsion		Pro	pellar	it Load 8	k Mea	sur	ing		4			
FUNCTIONAL DESCRIPTION 1ant tanks to provide and cutoff.												
PHYSICAL DESCRIPTION:	TBS				·							
TUG LOCATION:												
LO _{2 and LH₂ Tanks}			Inade	equate LO	⁰ 2 T	ank		Y	es			
LIFE DATA												
OPERATION LIFE:	· —			SHELF LII	FE:		MTBF 4,000	Ито		MTBR		
3,400 Hrs. TIME 20 CYCLES Indefinite (Des									ı	6,720 Hrs.		
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED												
18 2.5 TBD												
MAINTENANCE DATA					·							
	1 11	111	-}		SC	HD	UNSCHE	PRIMAR	Y TE	CHNIQUE		
MAINTENANCE LEVEL	х		MAIN	TENANCE	х		х	Condit	ion	- Monitoring		
OFI REQUIREMENTS: N/A												
MAINTENANCE FUNCTION Same as item 61 wi		ex	ception	n that th	his	iten	n is no	n=repara	ıble			
OTHER CONSIDERATIONS	/REMAR	KS										
None												
1												

MAINTENANCE ITEM DATA	-									
ITEM IDENTIFICATION:		- /			TAB	LE 5-1 I	REF:		FUN	ICTION NO.
APS Motor Assembly					Ιŧ	em 67			2	2.10, 2.11, 3.1 & 4.42
SYSTEM:	SUF	SYSTEM	1:	1		1,,,,,	CRI	TICALIT	Υ:	
Propulsion		APS				:		4		
FUNCTIONAL DESCRIPTION: Pr is not firing, also prov PHYSICAL DESCRIPTION: Motor	ides	roll v	vector th	nrus	t di	ring	mai	n engi	ne i	firings.
has a weight of 50 pound	s.		осору в с	C.		.opc o		0 k 30	Α.	ibb filelies and
TUG LOCATION:		ACCES	SIBILITY				•	LRU		
Intertank					Ye	S				
LIFE DATA										
OPERATION LIFE: SHELF LIFE: MTBF									i	MTBR
3,400 Hrs. TIME 20	CYC	LES	Indefin	aite		тв	D			TBD
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS 18 TBD							SPARE	S RE TBI	QUIRED:	
MAINTENANCE DATA										
 - 	1 111	 		SC	HD_	UNSCH		RIMARY	/ TEC	CHNIQUE
MAINTENANCE LEVEL X	x	TYPE	ITENANCE	:	x	х	,	Condit	ion	- Monitoring
OFIREQUIREMENTS: Baseline defined OFI is monitoring of soleniod v			ith the a	addi	tio	n of c	ont	inious	Cui	rrent signature
MAINTENANCE FUNCTIONS: 1. SCHEDULED MAINTENANCE a. Review flight OFI b. Perform system fun 2. UNSCHEDULED MAINTENAN a. Remove and replace or performance deg	data ctio CE (1 APS rada	to dennal tent LEVEL I motor tion.	st. I) assembiy							
b. Perform system per 3. UNSCHEDULED MAINTENAN a. Repair failed APS	CE (LEVEL :	II)	able	, tı	est, r	etu	rn to	sto	rage,
OTHER CONSIDERATIONS/REMA	RKS	······							<u></u>	
None										

MAINTENANCE ITEM DATA									
ITEM IDENTIFICATION:			TAB	LE 5-1 RE	F:	FUNCTION NO.			
Solenoid Fuel Prevalve			It	em 69		2.10, 2.11, 3.1 & 4.41			
SYSTEM: SI	JBSYSTEM:			C	RITICALIT	"Y:			
Propulsion	APS					4			
FUNCTIONAL DESCRIPTION: Provi	des contr	ol of N	2 ^H 4 suf	ply to	the APS	motor assemblies.			
	, , , , , , , , , , , , , , , , , , , ,								
PHYSICAL DESCRIPTION:									
TBS									
TUG LOCATION:	ACCESSIE	BILITY		······	LRU				
Intertank	Adequa	te	Yes						
LIFE DATA	<u> </u>								
OPERATION LIFE:	S	HELF LIF	E:	MTBF 4.000	Hrs.	MTBR			
3,400 Hrs. TIME 20 CY	CLES	ite	(Design		6,720 Hrs.				
NO. TIMES REFURBISHABLE	ANTICIPA	URB/100	B/100 FLIGHTS SPARES REQUIRED:						
18 2.5 TBD									
MAINTENANCE DATA									
MAINTENANCE I II II	11	-NANGE	SCHD	UNSCHD	PRIMARY	/ TECHNIQUE			
LEVEL X X	TYPE	NANCE	Х	x	Condit	ion - Monitoring			
OFI REQUIREMENTS:									
Same as item 15									
MAINTENANCE FUNCTIONS:					· · · · · · · · · · · · · · · · · · ·				
Care so item 15									
Same as item 15									
]									
						•			
				· · · · · · · · · · · · · · · · · · ·	, ,				
OTHER CONSIDERATIONS/REMARKS									
None									
	·								

MAINTENANCE ITEM DATA	<u> </u>			_		· · · · · · · · · · · · · · · · · · ·				
ITEM IDENTIFICATION:				T/	ABLE 5-1	REF:		NCTION NO.		
N2H4 Filter Assembl	у			I	tem 70			2.10, 2.11, 3.2 & 4.41		
SYSTEM:	S	JBSYSTEN	A:			CRITICALI	TY:			
Propulsion		APS				3				
FUNCTIONAL DESCRIPTION to prevent introduc	N: Provi	des fil	tering or nates in	n the to the	output APS fu	of the Neel lines	2H ₄	propellant tanks		
PHYSICAL DESCRIPTION:	тв	s								
TUG LOCATION:		ACCES	SIBILITY	_		LRU				
Intertank Adequate Yes										
LIFE DATA										
OPERATION LIFE:			SHELF LII	FE:	MTBF			MTBR		
1,320 Hrs. TIME	1,	320 Hrs.		1,320 Hrs.						
NO, TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED: 20 TBD										
MAINTENANCE DATA										
	1 11 1	11		SCHD	UNSCH	PRIMAR	Y TE	CHNIQUE		
MAINTENANCE LEVEL	Х	TYPE	TENANCE	Х	х		Time	e 		
OFI REQUIREMENTS: None										
MAINTENANCE FUNCTIONS: 1. SCHEDULED MAINTENANCE (LEVEL I) a. Remove and replace the filter assembly after every 5th flight. 2. UNSCHEDULED MAINTENANCE (LEVEL I) a. Any time the APS fuel system is opened for maintenance purposes, remove and replace the filters after system flush is completed.										
OTHER CONSIDERATIONS/REMARKS										
None										

TABLE 5-1 REF: FUNCTION NO. 2.10, 2.11, 3.1 N ₂ H ₄ Fill and Vent Quick Disconnects Ttems 72 & 73 & 4.41 SYSTEM: SUBSYSTEM: CRITICALITY:												
N ₂ H ₄ Fill and Vent Quick Disconnects Items 72 & 73 & 4.41												
SYSTEM: SUBSYSTEM: CRITICALITY:												
Propulsion APS 4												
FUNCTIONAL DESCRIPTION: Provides ground operations connections for the purpose of												
loading and flushing the N2H4 propellants.												
PHYSICAL DESCRIPTION:												
TBS												
TUG LOCATION: ACCESSIBILITY LRU												
Intertank Adequate Yes												
LIFE DATA												
OPERATION LIFE: SHELF LIFE: MTBF MTBR												
3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs.												
NO, TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED:												
18 2.5 TBD												
MAINTENANCE DATA												
1 11 111 SCHD UNSCHD PRIMARY TECHNIQUE												
MAINTENANCE X MAINTENANCE X X On Condition												
OFI REQUIREMENTS:												
None												
MAINTENANCE FUNCTIONS:												
Same as item 21												
OTHER CONSIDERATIONS/REMARKS												
None												

MAINTENANCE ITEM DAT	Α										
ITEM IDENTIFICATION:					TABLE 5-1 REF: FUNCTION NO.						
N ₂ H ₄ Propellant Tan	ık				I	tem 74			2.10, 2.11, 3.1 & 4.41		
SYSTEM:		SU	BSYSTE	VI:		С	RITICALI	TY:			
Propulsion			APS				4				
FUNCTIONAL DESCRIPTIO	N: Pr	ovide	s stor	age capal	oility	for N ₂ H ₄	requir	ed 1	for the mission.		
PHYSICAL DESCRIPTION:	Approximately 32 diameter sphere.										
TUG LOCATION:			ACCES	SIBILITY			LRU				
Intertank			Ina	dequate			Yes				
LIFE DATA											
OPERATION LIFE:				SHELF LI	FE:	MTBF			MTBR		
1,320 Hrs.	CY	CLES	nite	1,320	Hrs.		5 Flights				
NO, TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED:											
3 20 TBD											
MAINTENANCE DATA											
	1	11 11	-		SCHD	UNSCHD	PRIMARY	Y TE	CHNIQUE		
MAINTENANCE LEVEL	х	х	TYPE	ITENANCE :	х	х		Time			
OFIREQUIREMENTS: Baseline defined OF	T is	adeq	uate.		·						
MAINTENANCE FUNCTIONS: 1. SCHEDULED MAINTENANCE (LEVEL I) a. Remove and replace the APS propellant tanks after every 5th flight. 2. UNSCHEDULED MAINTENANCE (LEVEL I) a. Remove and replace the APS propellant tank any time the OFI data indicates 'degradation of the elastomer diaphram is degrading. 3. SCHEDULED MAINTENANCE (LEVEL II) a. Replace the elastomer diaphram, clean tank, leak test and return to storage.											
OTHER CONSIDERATIONS/REMARKS None											

MAINTENANCE ITEM DATA										
ITEM IDENTIFICATION:				T	ΑВ	LE 5-1 F	REF:		NCTION NO.	
Electrical Heater					1	tem 83	3		2.10, 2.11, 3.1 & 4.39	
SYSTEM:	SUE	BSYSTEM	1:				CRITICA	LITY:		
Thermal Control	Ac	tive Th	nermal Co	ontro]	L			4		
FUNCTIONAL DESCRIPTION:						- <u></u>				
Provides temperature con	dit	ioning	for the	forwa	ard	l skir	t panel	moun	ted avionics.	
PHYSICAL DESCRIPTION:								·		
TBS										
TUG LOCATION:		ACCESS	SIBILITY	<u>-</u> .			LRU			
Forward Skirt Adequate Yes								s		
LIFE DATA										
OPERATION LIFE: SHELF LIFE: MTBF 4,000 Hrs									MTBR	
3,400 hrs TIME 20)	n/A	
NO. TIMES REFURBISHABLE	ANTICIPATED REFURB/100 FLIGHTS						S SPA	SPARES REQUIRED:		
N/A N/A 1 Ship Set									Set	
MAINTENANCE DATA		·								
! !!	111			SCHE)	UNSCH	PRIMA	RY TE	CHNIQUE	
MAINTENANCE LEVEL x		MAIN TYPE	TENANCE	×		ж	Cond	ition	-Monitoring	
OFIREQUIREMENTS: Current signature monito compartment temperature computer.)										
MAINTENANCE FUNCTIONS: 1. Scheduled maintenance a. Review OFI data				alfunc	eti	ion or	degrad	ed op	eration.	
 a. Review OFI data for evidence of malfunction or degraded operation. 2. Unscheduled maintenance (Level I) a. Remove and replace heater based on flight data evidence of malfunction or degradation. b. Scrap non-repairable heater or return to vendor/depot for failure analysis. 										
OTHER CONSIDERATIONS/REMAR	KS									
None										

MAINTENANCE ITEM DATA											
ITEM IDENTIFICATION:						TAB	LE 5-1 F	REF:	Fυ	NCTION NO.	
Freon Accumulator						•	Item 8	4		2.1, 2.10, 2.11 & 3.1	
SYSTEM:		SUE	SYSTEM	1:				CRITIC	ALITY:		
Thermal Control		Acı	tive Th	nermal Co	ontro	1			3		
FUNCTIONAL DESCRIPTION	: Mair	nta	ins pos	sitive s	yster	n pi	ressur	e at	the pun	ps, compensates	
for liquid expansio	on and	COI	ntract	ion, and	prov	/ide	es mak	eup fo	or syst	em leakage.	
PHYSICAL DESCRIPTION:											
		T	BS								
TUG LOCATION: ACCESSIBILITY LRU											
Intertank			Ade	q uate					Yе	s	
LIFE DATA											
OPERATION LIFE: SHELF LIFE: MTBF MTBR 8,500 hrs											
Indefinite TIME 50 CYCLES Indefinite (Design goal)									10,000 hrs		
NO. TIMES REFURBISHABLI	E		ANTICI	PATED REI		/100				QUIRED:	
4 2 1 Ship Set									Set		
MAINTENANCE DATA											
i	1 11	111			SCF	1D	UNSCH	D PRIM	MARY TE	CHNIQUE	
MAINTENANCE LEVEL	x	ж	MAIN	TENANCE	×		х	Co	Condition-Monitoring		
OFIREQUIREMENTS: Monitor dc output of pressure transducer and monitor for decay at press/vent system supply source MAINTENANCE FUNCTIONS: 1. Scheduled maintenance (Level I) a. Review OFI data for evidence of failure or performance degradation. 2. Unscheduled maintenance (Level I) a. Remove and replace b. Recharge new accumulator as required during ground system check. c. Return removed accumulator to vendor/depot for repair											
OTHER CONSIDERATIONS/F			~								
3. Unscheduled maintenance (Level III) a. Vendor/depot repair and return to site None											

MAINTENANCE ITEM DATA												
ITEM IDENTIFICATION:				TAE	BLE 5-1 RI	EF:	FUN	ICTION NO.				
Freon Fill Valve				'	Item 85	•	2	2.1, 2.10 & 3.1				
SYSTEM:	SU	BSYSTEM	1 :			CRITICALI	ΤŸ:					
Thomas Garage	_ ا	ti M	hermal Co	netwo1			4					
Thermal Control FUNCTIONAL DESCRIPTION:	AC	rive II	uermar çi	DILLEGI	<u></u>							
Provides for initial	and re	p1enis	hment cha	arging	of frec	n accumu	ilat	or				
PHYSICAL DESCRIPTION: TBS												
THE LOCATION.	TUG LOCATION: ACCESSIBILITY LRU											
TUG LOCATION:		70063	SIBILITI									
Intertank Adequate Yes												
COPERATION LIFE: SHELF LIFE: MTBF MTBR												
OPERATION LIFE:		-E:	MTBF 8,500	hrs		MIRK						
Indefinite TIME 50	CYC	CLES	Indefin	ite		gn goal)		10,000 hrs				
NO. TIMES REFURBISHABLE	FURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED:											
5 2 1 Ship Set												
MAINTENANCE DATA												
1	11 11			SCHD	UNSCHE	PRIMAR	Y TE	CHNIQUE				
MAINTENANCE LEVEL x	K	TVDC	TENANCE	ж	x	On-Cor	ndit	ion				
OFI REQUIREMENTS:	<u> </u>			<u> </u>	<u></u>	\		***				
27.60												
n/A												
MAINTENANCE FUNCTIONS:			# \									
1. Scheduled mainten a. Check for pre	ance (qecan Tever	at accum	ulator	during	ground o	oper	ations checkout.				
2. Unscheduled maint	enance	(Leve	1 I)			6	•					
a. Remove and re	place											
b. Leak check re c. Return to ver	placed	l valve	e r renair									
c. Return to ver 3. Unscheduled maint	enance	Leve	el III)									
a. Vendor/depot				site								
OTHER CONSIDERATIONS/REM	ARKS											
O THE TONGIDE TATIONS/NEW												
None												

MAINTENANCE ITEM DATA											
ITEM IDENTIFICATION:			TAB	LE 5-1 R	EF:	FUNCTION NO.					
Freon Pump			It	em 86		2.10, 2.11 & 3.1					
SYSTEM:	SUBSYSTEN	Λ:	l <u>,_</u>		CRITICALIT	Y:					
Thermal Control	Active T	hermal Con	ntrol	Ì		4					
FUNCTIONAL DESCRIPTION:											
Provides system circulation of freon 21											
PHYSICAL DESCRIP (ION:											
TBS											
TUG LOCATION: ACCESSIBILITY LRU											
Intertank Adequate Yes											
LIFE DATA											
OPERATION LIFE: SHELF LIFE: MTBF MTBR 8,500 hrs 10,000 hrs											
l year TIME 50 CYCLES Indefinite (design goal) 10,000 hrs											
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED:											
5 2 1 Ship Set											
MAINTENANCE DATA											
I II III SCHD UNSCHD PRIMARY TECHNIQUE											
MAINTENANCE LEVEL x	l P	TENANCE	х	ж	Condi	tion-Monitoring					
OFIREQUIREMENTS: Monitor pump inlet/outlet pressure and freon flow rates. MAINTENANCE FUNCTIONS: 1. Scheduled maintenance (Level I) a. Review OFI data for evidence of failure or performance degradation. 2. Unscheduled maintenance (Level II) a. Remove and replace b. System check replaced pump during ground operations c. Return removed pump to vendor/depot for repair 3. Unscheduled maintenance (Level III)											
OTHER CONSIDERATIONS/REMARK											
a. Vendor/depot repair a	and retur	n to site.	•								
None											

MAINTENANCE ITEM DAT	Δ											
ITEM IDENTIFICATION:				<u> </u>			TAE	3LE 5-1	REF	: F	UN	CTION NO.
Dryer Assembly								Item 8				1, 2.10 & 3.1
SYSTEM:		St	JBS	YSTEM	1:	1			ÇR	ITICALITY	7 :	
Thermal Control		A	ct:	ive Th	nermal C	ontr	01			4		
FUNCTIONAL DESCRIPTIO	N:								<u> </u>			
Removes moisture		Freo	n :	21								
PHYSICAL DESCRIPTION:				···								
TBS												
TUG LOCATION: ACCESSIBILITY LRU												
Intertank		Adequ		Yes								
LIFE DATA												·
OPERATION LIFE: SHELF LIFE: MTBF												MTBR
Indefinite TIME N	CLI	ES	ite	TBD					TBD			
NO. TIMES REFURBISHAB	7	ANTICII	FURB	B/100 FLIGHTS SPARES R					DUIRED:			
TBD TBD 1 Ship Set											Bet	
MAINTENANCE DATA												
MAINTENANCE	1	11 1	11			SCH	HD.	UNSCH		RIMARY	TEC	HNIQUE
MAINTENANCE LEVEL	x			MAIN TYPE	TENANCE	×		x	C	n-Condi	tic	on
OFI REQUIREMENTS:							. —					
N/A												
MAINTENANCE FUNCTIONS: 1. Scheduled maintenance (Level I) a. Monitor discharge temperature during ground operational check for evidence of dryer degradation. 2. Unscheduled maintenance (Level I) a. Remove and replace.												
			<u> </u>		···							
OTHER CONSIDERATIONS	/REM	IARKS										
None												
\$4												

MAINTENANCE ITEM DATA														
ITEM IDENTIFICATION:			TAE	3LE 5-1 RE	F:	FUNCTION NO.								
Filter				Item 88		2.1, 2.10 & 3.1								
SYSTEM:	SUBSYSTE	v1:		C	RITICALIT	Υ;								
Thermal Control	Active T	hermal Co	ontro1			4								
	FUNCTIONAL DESCRIPTION: Protects temperature mixing valves from contamination PHYSICAL DESCRIPTION:													
PHYSICAL DESCRIPTION: TBS														
TUG LOCATION: ACCESSIBILITY LRU														
Intertank Adequate Yes														
LIFE DATA		<u></u>												
OPERATION LIFE: SHELF LIFE: MTBF MTBR														
Indefinite TIME N/A	TBD		N/A											
NO. TIMES REFURBISHABLE	PARES REQUIRED:													
N/A N/A 1 Ship Set														
MAINTENANCE DATA														
1 11	111		SCHD	UNSCHD	PRIMARY	TECHNIQUE								
LEVEL			x'	ж	Conditi	ion-monitoring								
MAINTENANCE LEVEL x x Condition-monitoring OFIREQUIREMENTS: Monitor $\triangle P$ across filter MAINTENANCE FUNCTIONS: 1. Scheduled maintenance (Level I) a. Review OFI differential pressure data for evidence of filter clogging. 2. Unscheduled maintenance (Level I) a. Remove and replace filter														
OTHER CONSIDERATIONS/REMARK	OTHER CONSIDERATIONS/REMARKS													
None														

MAINTENANCE ITEM DATA	4											
ITEM IDENTIFICATION:						TA	BLE 5-1 I	REF:	I	NCTION NO.		
Filter Bypass Valv	e						Item 8	9		1.2.10 & 3.1		
SYSTEM:			SUB	SYSTEM	1:			CRITICALITY:				
Thermal Control			Ac t	tive Th	nermal Co	ntrol	,		4			
FUNCTIONAL DESCRIPTION	N:	L		,		<u> </u>						
Provides filter by	pas:	s ir	ı Ca	ase of	fitter o	loggin	ıg					
PHYSICAL DESCRIPTION: TBS												
TUG LOCATION:				ACCES	SIBILITY				LRU			
Intertank Adequate Yes										s		
LIFE DATA												
OPERATION LIFE: SHELF LIFE: MTBF 8,500 hrs												
N/A TIME 2	20	(CYC	LES	ite			goal)	10,000 hrs			
NO, TIMES REFURBISHAB			ANTIC		0 FLIGH	TS	SPARES RE					
4						2			1 Ship S	et 		
MAINTENANCE DATA			·				· · · · · · · · · · · · · · · · · · ·					
***************************************		11	111	-}		SCHD	UNSCH		PRIMARY TE	CHNIQUE		
MAINTENANCE LEVEL	x	x		TYPE	ITENANCE	ж	x		On-Condi	tion		
OF REQUIREMENTS:		\ <u> </u>	·	<u> </u>								
N/A												
MAINTENANCE FUNCTION 1. Scheduled main a. Remove val b. Replace ro 2. Unscheduled ma a. Repair as	nten lve emov aint req	and ved ename	gr val nce ed	ound c ve (Leve	heck aft							
OTHER CONSIDERATIONS None	I/REN	ЛARН	ςS									
Non e												

日本のでは、その一般をいったが、これは、大学に対象が、集中の基準に対象がある。 日本のでは、日本の一般をいったが、日本の一般に対象が、集中の基準に対象がある。 日本のでは、日本の一般に対象が、大学に対象が、大学に対象が、日本の一般に対象がある。

MAINTENANCE ITEM DATA													
ITEM IDENTIFICATION:				TA	BLE 5-1	REF:	FUI	NCTION NO.					
Heat Exchanger - Pre Fl	ight				Item 9	90	2.	.10 & 3.1					
SYSTEM:	SUB	SYSTEM	1:			CRI	TICALITY:						
Thermal Control	Ac	tive T	nermal Co	ontro1			4						
FUNCTIONAL DESCRIPTION:													
Provides ground cooling during fuel cell checkout													
PHYSICAL DESCRIPTION:													
TBS													
TUG LOCATION: ACCESSIBILITY LRU													
Intertank Adequate Yes													
LIFE DATA													
OPERATION LIFE: SHELF LIFE: MTBF MTBR													
Indefinite TIME N/A	CYC	_ 1	I/A		N/A								
NO, TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED:													
N/A N/A 1 Ship Set													
MAINTENANCE DATA													
1 11		4		SCHD	UNSCH	ID P	RIMARY TE	CHNIQUE					
MAINTENANCE LEVEL x			TENANCE	ж	×		On-Condit	ion '					
MAINTENANCE FUNCTIONS: 1. Scheduled maintenance a. Monitor output failure or degr	OFIREQUIREMENTS: N/A - ground operation only MAINTENANCE FUNCTIONS: 1. Scheduled maintenance (Level I) a. Monitor output temperature during ground operations for indication of failure or degraded operation. 2. Unscheduled maintenance (Level I)												
OTHER CONSIDERATIONS/REMARKS None													

MAINTENANCE ITEM DAT	Ά										
ITEM IDENTIFICATION:							TA	BLE 5-1 F	REF	: FU	NCTION NO.
Radiator								Item 9	1	2	.10 & 3.1
SYSTEM:			SU	SYSTER	Λ:				CRI	ITICALITY:	
Thermal Control			Ac	tive T	hermal C	ontr	01			3	
FUNCTIONAL DESCRIPTION	N:										
Provides for heat	tra	nsfe	er								
PHYSICAL DESCRIPTION:										<u> </u>	
24" x 48" x TBS, 1	weig	ht =	* T	BS							
TUG LOCATION:		·		ACCES	SIBILITY					LRU	
Intertank			Adeq		S						
LIFE DATA					<u></u> .					<u> </u>	
OPERATION LIFE:				FE:		MTBF 8,500	n h	rg	MTBR		
Indefinite TIME	50	ļ	CYC	LES	Indefin	ite		(Desig	gn ;	goal)	10,000 hrs
NO. TIMES REFURBISHAB	NO. TIMES REFURBISHABLE ANTICIPATED REFUR										QUIRED:
5 2 1 Ship Set											Ship Set
MAINTENANCE DATA										·	
		П	111	_		sc	HD_	UNSCH	Р	RIMARY TE	CHNIQUE
MAINTENANCE LEVEL	ĸ	x		MAIN	TENANCE		ĸ	×		On-Condi	tion
OFI REQUIREMENTS:				-							
N/A											
										· · · · · · · · · · · · · · · · · · ·	
MAINTENANCE FUNCTION	-		_		- 4						
l. Scheduled main a. Visually i											
2. Unscheduled ma						age					
a. Remove and	l re	plac	e.								
3. Unscheduled ma a. Repair on			ic e	(Leve)	. 11)						
ar napazz on	010	_									
OTHER CONSIDERATIONS	REM	ARK	s	<u> </u>		······································					
None											

MAINTENANCE ITEM DAT	A								-			
ITEM IDENTIFICATION:							TAE	BLE 5-1 R	EF:	FU	NCTION NO.	
Selector Valve								Item 9	2	2.	10, 2.11 & 3.1	
SYSTEM:			SUE	SYSTEN	Λ.				CRI	TIJALITY:		
Thermal Control			Αc	tive T	hermal C	ontr	ol.			3		
FUNCTIONAL DESCRIPTIO Provide coolant f		to						mixing	va	lve		
PHYSICAL DESCRIPTION:												
TBS												
TUG LOCATION: ACCESSIBILITY LRU												
Intertank Adequate Yes											es	
LIFE DATA				<u>. </u>					_			
OPERATION LIFE: SHELF LIFE: MTBF 8,500 hrs												
N/A TIME	5 0	(CYC	LES	Indefin	ite				goal)	10,000 hrs	
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED:												
5 2 1 Ship Set												
MAINTENANCE DATA												
	ı	11	111	→		SC	HD	UNSCH		RIMARY TE	CHNIQUE	
MAINTENANCE LEVEL	ж	×		TYPE	TENANCE	ж		ж		Condition	-monitoring	
OFI REQUIREMENTS:	-							<u> </u>				
Monitor valve pos	itio	n.										
MAINTENANCE FUNCTION	IS:									· · · · · · · · · · · · · · · · · · ·		
1. Scheduled main		anc	e (Level	1)							
a. Review OF						ailu	re	or per	for	mance deg	radation.	
2. Unscheduled ma a. Remove and				(Leve	1 1)							
3. Unschedule ma				(Level	11)							
a. Repair on	sit	e										
OTHER CONSIDERATIONS	REN	IARK	S									
None												
Twite												

MAINTENANCE ITEM DATA												
ITEM IDENTIFICATION:			TAE	3LE 5-1 RE	F:	FUNCTION NO.						
Flow Control Valve]	Item 93		2.10, 2.11 & 3.1						
SYSTEM:	SUBSYSTEM	Λ:		С	RITICALIT	Υ:						
Thermal Control	Active Th	ermal Co	ntrol			4						
FUNCTIONAL DESCRIPTION:												
Regulates amount of coola	nt flowir	ng throug	h or by	passing	the rad:	iator.						
PHYSICAL DESCRIPTION:				 <u></u> -								
TES												
TUG LOCATION: ACCESSIBILITY LRU												
Intertank	Adequ	iate		Yes								
LIFE DATA												
OPERATION LIFE:		E:	MTBF 8,500	MTBR								
N/A TIME 50	CYCLES	Indefin	ite	(Design		10,000 hrs						
NO. TIMES REFURBISHABLE	ANTIC	PATED REF	REQUIRED:									
5		2	2 1 Ship Set									
MAINTENANCE DATA												
1 11	111		SCHD	UNSCHD	PRIMARY	TECHNIQUE						
MAINTENANCE LEVEL x x	MAIN TYPE	TENANCE	ж	x	Condition	on-monitoring						
OFI REQUIREMENTS:	1		<u> </u>	<u> </u>	J							
Monitor Valve Position												
MAINTENANCE FUNCTIONS:			·									
Same as item 92												
1												
<u>.</u>												
OTHER CONSIDERATIONS/REMARK	S											
None												
NASS,31011 8.74 (PRELIMINARY)	H. h	·····	·									

MAINTENANCE ITEM DATA											
ITEM IDENTIFICATION:				TAE	3LE 5-1 RI	EF: 1	UNCTION NO.				
Temperature Sensor					Item 94	-	.10, 2.11, 3.1 &				
SYSTEM:	SUBS	YSTEM	1:	1	C	RITICALITY	/ :				
Thermal Control	Act	ive T	hermal Co	ontrol			3				
FUNCTIONAL DESCRIPTION: Measures temperature of					ll heat	exchange	r.				
PHYSICAL DESCRIPTION:			<u> </u>		· · · · · · · · · · · · · · · · · · ·	····					
TBS											
TUG LOCATION:	1	ACCESS	SIBILITY			LŖU					
I certank Adequate Yes											
LIFE DATA		,									
OPERATION LIFE: SHELF LIFE: MTBF 4,000 hrs C 700 W											
β,400 hrs TIME 20	CYCLI	ES	ite		nrs n goal) 6,720 Hrs						
NO. TIMES REFURBISHABLE	1	ANTICH	PATED REF	URB/100	FLIGHTS	SPARES	REQUIRED:				
N/A		1	Ship Set								
MAINTENANCE DATA			 								
1 11	111			SCHD	UNSCHD	PRIMARY	TECHNIQUE				
MAINTENANCE LEVEL x		MAIN TYPE	TENANCE	x	ж	Condit	ion-monitoring				
OFIREQUIREMENTS: Monitor output of temper	ature	ė sens	sor								
MAINTENANCE FUNCTIONS: 1. Scheduled maintenance a. Review OFI data 2. Unscheduled maintena a. Remove and repla	for e	evider	nce of fa	ailure	or perf	ormance d	egradation.				
OTHER CONSIDERATIONS/REMAR	KS										
None											
<u> </u>											

MAINTENANCE ITEM DATA												
ITEM IDENTIFICATION:							TAE	LE 5-1 F	REF:		FUN	NCTION NO. 1, 2.10, 2.11 &
Helium Control Val	Lve							Item 9	5		3.	
SYSTEM.			SUE	SYSTER	Λ:			-	CRI	TICALIT	Y:	
Thermal Control			Act	tive T	hermal C	ontr	ol_			4		
FUNCTIONAL DESCRIPTIO			_		_							
Provides shutoff o	cont	rol	101	r hell	um suppl	y to	th	e treo	n a	eculul.	ato:	r
PHYSICAL DESCRIPTION:												
TBS												
TUG LOCATION: ACCESSIBILITY LRU												
Intertank	Adeq		Yes									
LIFE DATA								,				
OPERATION LIFE:		FE:		MTBF 8,50	0 h	rs		MTBR				
N/A TIME 50	LES	ite				goal)	10,000 hrs					
NO. TIMES REFURBISHAB	ANTIC	FURE	3/100	FLIGHT	rs	SPARE	SRE	QUIRED:				
5 2 l ship set											l ship set	
MAINTENANCE DATA												
AAAINTENANE	1	11	111	→			HD	UNSCH	D P	RIMARY	/ TEC	CHNIQUE
MAINTENANCE LEVEL	ж	ж		TYPE	ITENANCE	×		ж	С	onditi	on-l	Monitoring
OFI REQUIREMENTS:									•			
Monitor valve pos	siti	on										
MAINTENANCE FUNCTION	NS:											
Same as item 92												
Jame 25 Item 72												
1												
-												
OTHER CONSIDERATIONS	REN	ARK	S									
None												

MAINTENANCE ITEM DATA												
ITEM IDENTIFICATION:				TA	BLE 5.1 f	REF:	FUI	ICTION NO.				
Helium Regulator Valve					Item 9	96	2.1 3.1	, 2.10, 2.11 &				
SYSTEM:	SUB	SYSTEM	1:			CRI	TICALITY:					
Thermal Control	Act	ive Th	ermal Co	ntrol			TBD					
FUNCTIONAL DESCRIPTION:	<u></u>											
Regulates the pressure of helium entering the freon accumulator from the pressurization and vent system												
PHYSICAL DESCRIPTION:												
TBS												
TUG LOCATION: ACCESSIBILITY LRU												
Intertank		Ade				Yes						
LIFE DATA		_	lovere		LATRE							
OPERATION LIFE:			SHELF LII	FE:	MTBF 4,000) hr	s	MTBR				
3,400 hrs TIME 20	CYC		Indefin		(Desig		Goal) 6,720 hrs					
NO, TIMES REFURBISHABLE		ANTICI	PATED RE	FURB/10	00 FLIGH	TS	SPARES REQUIRED:					
5				3			1 Ship	Set				
MAINTENANCE DATA		· · · · · · · · · · · · · · · · · · ·		1		. 15	0.44.07.75	211110115				
MAINTENANCE	111	_	TENANCE	SCHD	UNSCH	쁴	RIMARY TE	CHNIQUE				
LEVEL X X		TYPE		x	х		Condition	-monitoring				
OFI REQUIREMENTS:		<u> </u>		••			_					
Monitor valve operation												
MAINTENANCE FUNCTIONS:												
WANTENANCE TOTAL TONS.												
Same as item 92												
OTHER CONSIDERATIONS/REMAR	KS											
None												

MAINTENANCE ITEM DATA												
ITEM IDENTIFICATION:					TAE	BLE 5-1 F	REF:	FUI	NCTION NO.			
Helium Vent Valve						Item 9	7	2.	1, 2.10, 2.11 & 1			
SYSTEM:	SUB	SYSTEN	1:				CRITICA	ALITY.				
Thermal Control	Act	ive Ti	hermal C	ontr	01	i		TE	SD.			
FUNCTIONAL DESCRIPTION:	-		,									
Provide relief for excessive helium pressure in the freon accumulator due to thermal expansion of coolant or regulator malfunction.												
PHYSICAL DESCRIPTION:												
TBS												
THE LOCATION. ACCESSIBILITY TIPE												
TUG LOCATION: ACCESSIBILITY LRU												
Intertank Adequate Yes												
LIFE DATA												
OPERATION LIFE: SHELF LIFE: MTBF 4,000 hrs												
3,400 hrs TIME 20 CYCLES Indefinite (Design Goal) 6,720 hrs												
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED:												
5		·	3					1_	Ship Set			
MAINTENANCE DATA	·					T = =	- 100.04	4 D V 7 P	N. M. O. D. E.			
MAINTENANCE	111	MAIN	TENANCE	SCI	HD_	UNSCH	D PR IIVI	AHY IE	CHNIQUE			
LEVEL x x		TYPE	1 ENAINCE	х		ж	0n·	-Condi	tion			
OFI REQUIREMENTS:		· <u> </u>										
N/A												
								÷				
MAINTENANCE FUNCTIONS:												
1. Scheduled maintenanc				_	_			_				
a. Ground check for 2. Unscheduled maintena				and	re	lief s	etting	after	20 flights.			
a. Remove and repla												
3. Unscheduled maintena	nc e	(Level	l II)									
a. Repair onsite an	d ad	just t	co relie	f se	tti	ng						
OTHER CONSIDERATIONS/REMAR	OTHER CONSIDERATIONS/REMARKS											
None												
	·											

											
MAINTENANCE ITEM DAT	Α										
ITEM IDENTIFICATION:							TAB	LE 5-1 I	REF		NCTION NO.
Heat Pipe								Item 9	8	2.	10 & 3.1
SYSTEM:		S	UB	SYSTEN	/ 1:			7	CR	ITICALITY:	
Thermal Control			Ac t	ive T	hermal C	ontr	01			TB	D
FUNCTIONAL DESCRIPTION Transfer heat from the circumferential	m ho			to co	ol side	of t	he v	vehicl	e f	or therma	l control
PHYSICAL DESCRIPTION: 낭'' * 눌'' * 120", w	eigh	t = '	ГВI)							
TUG LOCATION:				ACCES	SIBILITY					LRU	
Intertank/Fwd Ski	rt			Adeq	ua te					Ye	s
LIFE DATA											
OPERATION LIFE:					SHELF LI	FE:		MTBF		_ 	MTBR
Indefinite TIME N	/A	С	YC	LES	Indefin	ite			TBE)	TBD_
NO, TIMES REFURBISHAE	BLE			ANTIC	PATED RE	FURE	3/100	FLIGH	TS	SPARES RE	QUIRED:
n/A					N/A					1 Ship S	et
MAINTENANCE DATA		T				,		7			
MAINTENANCE	1	11	111	٠	TEN 4100	 	HD	UNSCH	미	PRIMARY TE	CHNIQUE
MAINTENANCE LEVEL	×			TYPE	ITENANCE	1	ж	ж		On-condit	ion
OFI REQUIREMENTS:		l		<u> </u>				· · · · · · · · · · · · · · · · · · ·			
N/A											
MAINTENANCE FUNCTIO 1. Scheduled mai a. Visually 2. Unscheduled m a. Remove an	nten insp aint	ect :	for ce	dama	ge						
OTHER CONSIDERATION	S/REM	MARK:	5					-		·····	

MAINTENANCE ITEM DATA							
ITEM IDENTIFICATION:	-			TAE	3LE 5-1 RE	F: FL	INCTION NO.
Thermal Splice					Item 99	2	2.10 & 3.1
SYSTEM:	SUE	SYSTEN	Λ:		CI	RITICALITY:	
Thermal Control	Ac	tive T	hermal Co	ontrol		4	
FUNCTIONAL DESCRIPTION:		·			•		
Provides thermal conne	ction	betwe	en lengti	hs of h	eat pipe	:	
PHYSICAL DESCRIPTION:					=		-
TBS							
TUG LOCATION:		ACCES	SIBILITY			LRU	
Intertank/Fwd Skirt		Adeq	uate			Y	es
LIFE DATA		· · · · · · · · · · · · · · · · · · ·		<u></u>			
OPERATION LIFE:			SHELF LIF	=E:	MTBF		MTBR
IndefiniteTIME N/A	CYC	LES	Indefin:	ite	TBD		TBD
NO. TIMES REFURBISHABLE		ANTICI	PATED REF	URB/100	FLIGHTS	SPARES R	EQUIRED:
N/A			N/A			1 Sh:	ip Set
MAINTENANCE DATA				r			
1	11 111	 		SCHD	UNSCHD	PRIMARY TO	ECHNIQUE
MAINTENANCE LEVEL		TYPE	TENANCE	ж	x	On-coudi:	tion
OFI REQUIREMENTS:		!			J		***************************************
n/A							
MAINTENANCE FUNCTIONS:		•					
Same as item 98							
OTHER CONSIDERATIONS REMA	ARKS			· · · · · · · · · · · · · · · · · · ·			
None							

MAINTENANCE ITEM DATA	Α									
ITEM IDENTIFICATION:					7	ГАВІ	LE 5-1 RE	F:	FUNCTION NO.	
Multilayer Insulat	ion -	LH ₂	Tank			I	tem 101	L	2.7, 3.1 & 4.23	
SYSTEM:	,	SUE	SYSTEM	Л:			C	RITICALIT	Y:	
Thermal Control		LH,	Tank	Insultio	on				4	
FUNCTIONAL DESCRIPTIO	N:									
Protects LH ₂ tank	from	prope	ellant	heating						
PHYSICAL DESCRIPTION:							·			
Goldized Kapton Su	perflo	ю, 2	23 lay	er, 0.77 ¹	'thio	ck,	weight	: = 90 1 ¹	bs	
TUG LOCATION:			ACCES	SIBILITY				LRU	, , , , , , , , , , , , , , , , , , ,	7
LH ₂ Tank Wrap				n/A				No	•	
LIFE DATA										
OPERATION LIFE:				SHELF LII	FE:		MTBF		MTBR	
N/A TIME N	/A	CYC	LES	N/A			N/	'A	N/A	
NO. TIMES REFURBISHABI	LE		ANTICI	PATED RE	FURB/	100	FLIGHTS	SPARE	S REQUIRED:	
n/A				N/A					No	
MAINTENANCE DATA					•					
	1 11	111	 		SCH		UNSCHD	PRIMARY	TECHNIQUE	
MA!NTENANCE LEVEL	x	ж	TYPE	TENANCE	x		ж	On-Gor	ndition	
OF REQUIREMENTS:		•								
N/A										
MAINTENANCE FUNCTION	IS:									
1. Scheduled main	tenano	e (I	evel 1	I)	aanti	~m+=	aation	dun to a	moisture if	
a. Visual ins access pro						311171	HALIUH	aue co i	morsture ii	
2. Unscheduled ma	intena	ance	(Leve	L III)						
									would require of insulation.	
		,			-cpo-c	101	repre	Coment C	71 INSCIBLION	
OTHER CONSIDERATIONS	REMAR	≀KS								
None										į
!										

MAINTENANCE ITEM DATA	A			, , , , , , , , , , , , , , , , , , , ,							
ITEM IDENTIFICATION:						TAE	BLE 5-1 R	EF:		FUN	ICTION NO.
Purge Bag - LH ₂ Ta	nk					1	item 10:	2		2.7	7, 3.1 & 4.23
SYSTEM:		SUI	BSYSTEM	n:				CRIT	TICALIT	Υ:	
Thermal Control		LH,	Tank	Insulati	lon					4	
FUNCTIONAL DESCRIPTIO Provides housing f shielding.		nsulat	ion, p	ourge con	ntair	ımer	it, and	ad	ded mi	cro	meteoroid
PHYSICAL DESCRIPTION:											
Teflon impregnated	Dacı	ron									
TUG LOCATION:			ACCES	SIBILITY					LRU		
LH ₂ Tank Wrap			:	TBD						No	•
LIFE DATA											
OPERATION LIFE:				SHELF LII	FE:		MTBF				MTBR
N/A TIME N	I/A	CYC	LES	N/A			N	/A			N/A
NO. TIMES REFURBISHAB	LE		ANTICI	PATED RE	FURB	/100	FLIGHTS	s	SPARES	RE	QUIRED:
N/A				N/A						No	
MAINTENANCE DATA											
	1	[] []	⊣	ı	SCI	HD.	UNSCHO	PF	HMARY	TEC	CHNIQUE
MAINTENANCE LEVEL	x		MAIN TYPE	TENANCE	x		ж		On-Cor	ndit	ion
OFI REQUIREMENTS:					L		<u></u>				
N/A											
MAINTENANCE FUNCTION	15.										
1. Scheduled main	tena	nce (Level :	I)							
a. Visual ins	pect	ion f	or evic	dence of	tea:	rs/j	punc tur	es.			
2. Unscheduled ma a. Perform pa									1		
a. reflorm he	iccii .	on pu	rec oa	5							
OTHER CONSIDERATIONS	/REMA	ARKS									
None											

MAINTENANCE ITEM DAT	A											
ITEM IDENTIFICATION.							TA	3LE 5-1 F	REF:		FUN	ICTION NO.
Multilayer Insulat	tion	. -]	Լ0 ₂	Tank				Item 1	04		2.	7, 3.1 & 4.23
SYSTEM:			SUE	SYSTEM	1:				CRI	TICALIT	ΓY:	
Thermal Control			LO	Tank	Insulat	ion				4		
FUNCTIONAL DESCRIPTION	N:											
Protects LO ₂ tank	fro	m pı	co p	ellant	heating							
PHYSICAL DESCRIPTION:												
Goldized Kapton Su	ıper	floc	2, 1	23 lay	er, 0.77	" th	ick	, weigl	ht:	= 40 p	oun	ds
TUG LOCATION:				ACCES	SIBILITY					LRU		
LO ₂ Tank Wrap]	N/A						No	
LIFE DATA												
OPERATION LIFE:					SHELF LIF	FE:		MTBF				MTBR
N/A TIME NA	/A	(CYC	LES	N/4	A			N	/A		N/A
NO. TIMES REFURBISHAS	LΕ			ANTICI	PATED REF	FURB	/100	FLIGHT	S	SPARE	SRE	QUIRED:
N/A					N/2	A					No	
MAINTENANCE DATA						,		,				
	1		111	-4		SCI	-dh	UNSCH	민Р	RIMARY	TEC	CHNIQUE
MAINTENANCE LEVEL	ж		ж	MAIN	TENANCE	x		ж		On-co	ndit	ion
OFI REQUIREMENTS:	<u> </u>	L	L	· 1. · · · · ·				<u> </u>			,	
N/A												
MAINTENANCE FUNCTION	IS:											
Same as item 1	01											
OTHER CONSIDERATIONS	D.C.1	4.54	<u> </u>									
OTHER CONSIDERATIONS	HEN	инк	.5									
None												

MAINTENANCE ITEM DATA	Α									
ITEM IDENTIFICATION:					ī	ГАВ	LE 5-1 RE	F:	FU	NCTION NO.
Purge Bay - LO ₂ Ta	ank					I	Item 105	.	2	.7, 3.1 & 4.23
SYSTEM:		SUI	BSYSTEN	۸:			C	RITICALIT	ГΥ:	
Thermal Control		ro	2 Tank	Insulati	ion				4	
FUNCTIONAL DESCRIPTIO	N:		1,	<u> </u>						
Provides housing in shielding	for in	nsula	tion,	purge cor	ntain	men	it, and	added n	icr	ometeoroid
PHYSICAL DESCRIPTION:										
Teflon impregnated	d Dacı	ron					·			
TUG LOCATION:			ACCES	SIBILITY				LRU		· · · · · · · · · · · · · · · · · · ·
LO, Tank Wrap				TBD					N	o
LIFE DATA										
OPERATION LIFE:				SHELF LIF	Ε:	Í	MTBF			MTBR
N/A TIME I	N/A	CYC	CLES	N/A			N/	'A		N/A
NO. TIMES REFURBISHAB	LE		ANTICI	PATED REF	URB/	100	FLIGHTS	SPARE	SRE	QUIRED:
N/A				N/A	<u></u>				N	0
MAINTENANCE DATA			-							
MAINTENANCE		11 11	⊣	TEN ANCE	SCH		UNSCHD	PRIMARY	/ IE	CHNIQUE
LEVEL	x		TYPE	ITENANCE	×		×	On∽Co	ndi	tion
OF! REQUIREMENTS:		•				-				
N/A										
MAINTENANCE FUNCTION			·							
1. Scheduled mgin					tear	:s/g	punc tur	es		
2. Unscheduled m	ainte	nance	(Leve	1 I)		Ī	•			
a. Perform pa	atch (on pu	rge ba	g						
OTHER CONSIDERATIONS	REMA	RKS							-	
None										
										

MAINTENANCE ITEM DAT	Α								
ITEM IDENTIFICATION:					TA	BLE 5-1 R	EF:	FU	NCTION NO.
LH ₂ Purge Pressure	e Reg	ulato	r			Item 10	7	2.1 4.2	0, 2.11, 3.1 & /
SYSTEM:		SU	BSYSTER	И:			CRITICALI	TY:	
Thermal Control		Ir	sulati	on Purge			L	•	
FUNCTIONAL DESCRIPTION	N:								
Regulates He purgo	e pre	ssure	to th	e LH ₂ pu	rge bag	;			
PHYSICAL DESCRIPTION:						*-			
TBS									
TUG LOCATION:			ACCES	SIBILITY			LRU		
Adopter			Adea	uate				Yes	
Adapter LIFE DATA			1						
OPERATION LIFE:				SHELF LII	FE:	MTBF			MTBR
3,400 hrs TIME	20	CY	CLES	lndefin	ite	4,000 (Design	hrs gn goals))	6,720 hrs
NO, TIMES REFURBISHAB				PATED RE					QUIRED:
5				3				1	Ship Set
MAINTENANCE DATA			1						
	1	11 11	ı [SCHD	UNSCH	PRIMAR	Y TE	CHNIQUE
MAINTENANCE LEVEL	ж		MAIN	ITENANCE	x	ж	On-Coi	ndit	ion
OFI REQUIREMENTS:	LL					•	_L		
						•			
N/A									
MAINTENANCE FUNCTION 1. Scheduled mai		nc e	/Level	т					
a. Ground ch	ec kou	it of	pressu	re regul	ator, 1	ecalib	ration e	very	20 flights
2. Unscheduled m	aint∈	enance	e (Leve	1 I)	•				
a. Remove an	d rep	lace	as req	uired					·
OTHER CONSIDERATIONS	REMA	ARKS			 			-	
None									

少了,这个人的人,只是一个人的人,也是一个人的人的人的人,也是一个人的人的人的人的人,也是一个人的人的人的人的人的人的人,也是一个人的人的人的人的人,也是这种人的

MAINTENANCE ITEM DATA											
ITEM IDENTIFICATION:					TAE	3LE 5-1 F	REF:	1	FUN	ON NO.	, '
LO ₂ Purge Pressure Regul	ato	r				Item 1	98		.10	, 2.11,	3.1 &
SYSTEM:	SUE	SYSTE	A:		·~		CR	TICALITY	Y :		
Thermal Control	In	sulati	on Purge	1		_	i	4			
FUNCTIONAL DESCRIPTION:											
Regulates He purge press	ure	to th	e LO ₂ pu	rge	bag	.					
PHYSICAL DESCRIPTION:					.,		· · ·		- 177		
TBS		, 			_						
TUG LOCATION:		1	SIBILITY					LRU			
Adapter		Adequ	ate					Ye	28		
LIFE DATA						,					
OPERATION LIFE:			SHELF LII	FE:		MTBF 4,00	0 F	ırs	1	MTBR	
3,400 hrs TIME 20	CYC	LES		.te				goal)		6,720 h	:s
NO, TIMES REFURBISHABLE		ANTIC	PATED REI	FURB	/100	FLIGHT	rs	SPARES	REC	QUIRED:	
5				3					1	Ship Set	Ė
MAINTENANCE DATA											
1 11	111	_		SCI	HD	UNSCH	D P	RIMARY	TEC	HNIQUE	
MAINTENANCE LEVEL x		MAIN	ITENANCE	ж		x		On-Co	ondi	ltion	
OFI REQUIREMENTS:	· <u>-</u>	<u></u>									
N/A											
MAINTENANCE FUNCTIONS:											
1. Scheduled maintenand											
a. Ground checkout				ator	:, r	ecalit	rat	ion eve	ery	20 fligh	nts.
2. Unscheduled maintena a. Remove and repla											
			,								
OTHER CONCIDERATIONS OF THE											
OTHER CONSIDERATIONS/REMAR	K2										
None											
1											

MAINTENANCE ITEM DATA	1							
ITEM IDENTIFICATION:					TA	ABLE 5-1 R	EF:	FUNCTION NO.
LH ₂ Purge Control	Valve					Item 10	9	2.10, 2.11, 3.1 & 4.23
SYSTEM:		SUE	SYSTE	vi:	· · · · · · · · · · · · · · · · · · ·	(CRITICALI	ΓΥ:
Thermal Control		In	sulati	on Purge	•			4
FUNCTIONAL DESCRIPTION Provides shutoff c	N: ontrol	for	r He p	ourge sup	ply to	the LH ₂	purge b	eag.
PHYSICAL DESCRIPTION:							···· - , , , , , , , , , , , , , , , , ,	
TBS								
TUG LOCATION:			ACCES	SIBILITY		·	LRU	
Adapter			A	dapter			Y	es!
LIFE DATA	 ,, · · , , , ;						. <u></u>	
OPERATION LIFE:	20			SHELF LI		MTBF 4,000		MTBR 6,720 hrs
3,400 hrs TIME		CYC	•	<u> </u>		0 FLIGHTS	n goal)	S REQUIRED:
5			ANTICI	3	COND IL	JU PLIGHTS	·	ip Set
MANCE DATA				**********				
	1 1#	HI			SCHD	UNSCHD	PRIMARY	' TECHNIQUE
MAINTENANCE LEVEL	ж		TYPE	ITENANCE	ж	x	On-Co	ndition
OFI REQUIREMENTS:		l	. I		I		<u> </u>	
n/A								
MAINTENANCE FUNCTIONS	S:	•				····		
1. Scheduled main		•						
a. Ground che2. Unscheduled ma					ration	l		
2. Unscheduled ma a. Remove and								
3. Unscheduled ms	intena	nc e	Cleve	1 11)				
a. Repair on	site a	nd	retest	:				
OTHER CONSIDERATIONS/	REMARK	S						
None								

MAINTENANCE ITEM DATA	Α									
ITEM IDENTIFICATION:					TAE	3LE 5-1 R	REF:		FUNCTION NO.	
LO ₂ Purge Control	Valve					Item 1			2.10, 2.11, 4.23	3.1 &
SYSTEM:	S	UBSYSTE	M:				CRITIC	CALIT	Y:	
Thermal Control		Insulat	ion Purge	ł					4	
FUNCTIONAL DESCRIPTION	N:									
Provides shutoff of	control	for He	purge sup	ply	to	the LO	2 pur	ge ba	ag.	
									_	
PHYSICAL DESCRIPTION:										
	TBS									
TUG LOCATION:		1	SSIBILITY				LI	RU		
Adapter		Ada	pter						Yes	
LIFE DATA			- 			7				
OPERATION LIFE:			SHELF LI	FE:		MTBF	L -		MTBR	
3,400 hrs TIME	20 C	YCLES	Indefini	te		4,000 (Design		1)	5,720 hrs	
NO. TIMES REFURBISHABI		ANTIC	IPATED RE						REQUIRED:	
5		Ì	3					1 Sł	nip Set	
MAINTENANCE DATA							·			
	l l1	111		SC	HD	UNSCH	D PRIN	MARY	TECHNIQUE	
MAINTENANCE LEVEL	x x	MAI TYP	NTENANCE E	K	:	- K	0	n-Coi	ndition	
OFI REQUIREMENTS:			<u> </u>	<u> </u>						
N/A										
					_					
MAINTENANCE FUNCTION		/T *	T.\							
1. Scheduled mair a. Ground che		•	•	rati	on					
2. Unscheduled ma	aintenan	ce (Lev	el I)	1						
a. Remove and										
3. Unscheduled ma										
a. Kepail off	2254 611	_ 1000	-							
						· ·				
OTHER CONSIDERATIONS	REMARKS									
None										

MAINTENANCE ITEM DATA	Ą									
ITEM IDENTIFICATION					TA	ABLE 5-1	REF	ì		ICTION NO.
LH ₂ Purge Vent Val	ve					Item 1	11		2.1 4.2	0, 2.11, 3.1 & 3
SYSTEM:			SUB	SYSTEM:	i - ·		CR	ITICALIT	Υ:	
Thermal Control			In	sulation Purge	:					4
FUNCTIONAL DESCRIPTIO	N:			-						
Provides vent capa	bili	ity	for	purge operati	lons					
PHYSICAL DESCRIPTION:				.						
TBS										
TUG LOCATION:				ACCESSIBILITY				LRU		
Intertank				Adequate					Yes	
LIFE DATA										
OPERATION LIFE:				SHELF LII	FE:	MTBF 4,00	0 h	rs		MTBR
3,400 hrs TIME	20	(CYC	LES Indefini	ite			Goal)		6,720 hrs
NO. TIMES REFURBISHAB				ANTICIPATED RE	FURB/10	00 FLIGH	TS	SPARES	SRE	QUIRED:
5					3			1 9	Ship	Set
MAINTENANCE DATA										
	ı	11	111		SCHD	UNSCH	1D F	PRIMARY	TEC	CHNIQUE
MAINTENANCE LEVEL	ж	ж		MAINTENANCE TYPE	x	ж		On-Cond	liti	.on
OFI REQUIREMENTS:				<u></u>						
N/A										
Unscheduled ma a. Remove and 3. Unscheduled ma	ten ck int l re int	for enan plac enan	pro ce e a	per operation (Level I) as required.			ett	ing aft	ter	20 flights
OTHER CONSIDERATIONS None	REM	ARK	S							

MAINTENANCE ITEM DAT	Α											
ITEM IDENTIFICATION:						٦	AB	BLE 5-1 R	EF:	FU	NCTION NO.	
LO ₂ Purge Vent Va	1ve							Item 11	.2		10, 2.11, 23	3.1 &
SYSTEM:			SUB	SYSTEM	A:			0	CRI	TICALITY:		
Thermal Control			In	sulati	on Purge					4		
FUNCTIONAL DESCRIPTION)N:											
Provides vent cap	abi]	lity	fo	r purg	e operat	ions						
PHYSICAL DESCRIPTION:											<u> </u>	
TBS												
TUG LOCATION:				ACCES	SIBILITY					LRU		
Aft Skirt			3	Ade	quate	<u></u>				Yes		
LIFE DATA					(I			1	
OPERATION LIFE:					SHELF LII	FE:		MTBF 4,000	hr	s	MTBR	
3,400 hrs TIME		20	CYC	LES	Indefin	ite		(Desig		Goal)	6,720	hrs
NO, TIMES REFURBISHAB	LE			ANTICI	PATED RE	FURB/	100	FLIGHT	S	SPARES R		
5					3					1 Shi	Set	
MAINTENANCE DATA	,	,	,			,		,	,			
		11	111	_		SCH	D	UNSCHE) P	RIMARY TE	CHNIQUE	
MAINTENANCE LEVEL	x	×		TYPE	ITENANCE	ж	:	x		On-Condit	tion	
OFI REQUIREMENTS:												
N/A												
								··				
MAINTENANCE FUNCTION	VS:											
Same as item 111												
OTHER CONSIDERATIONS	REN	MAR	(S					-				· · · · · · · · · · · · · · · · · · ·
None												
NIACO 21011 O 74 IDDELIMIN	4 4 17 3											

MAINTENANCE ITEM DATA													
ITEM IDENTIFICATION:				-	TAB	LE 5-1 R	REF:	FL	JNCTION NO.				
Radiation Shield						Item 1	14	2	.7 & 3.1				
SYSTEM:	SUB	SYSTEN	1 :	<u>k</u> _			CRI	TICALITY:					
Thermal Control	Pa	ssive	Thermal	Conti	rol			4	•				
FUNCTIONAL DESCRIPTION:													
Provides thermal protect	ion	durin	g payloa	d ori	ien	tation	to	wards th	e sun.				
PHYSICAL DESCRIPTION:							•						
TBS													
TUG LOCATION:		ACCESS	SIBILITY				I	LRU					
Fwd Skirt - external to		Ade	quate					Y	es.				
LIFE DATA													
OPERATION LIFE: SHELF LIFE: MTBF MTBR													
Indefinite TIME N/A CYCLES Indefinite N/A N/A													
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED:													
N/A	İ		N/A					1 Ship	Set				
MAINTENANCE DATA							<u></u>						
1 11	111			SCH	D	UNSCHE) PF	RIMARY TECHNIQUE					
MAINTENANCE LEVEL x		MAIN TYPE	TENANCE	×		×		On-Cond	ition				
OFI REQUIREMENTS:		J		1									
N/A													
,													
MAINTENANCE FUNCTIONS:													
1. Scheduled maintenanc													
 a. Visually inspect 2. Unscheduled maintena 													
 Unscheduled maintena a. Remove and repla 		(Leve	1 1)										
•													
OTHER CONSIDERATIONS REMARK	<s< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></s<>												
None													

<u></u>				.,,,,								
MAINTENANCE ITEM DATA	4											
ITEM IDENTIFICATION:							TAB	LE 5-1 F	REF:	:		ICTION NO.
Inertial Measuremen	t Ur	nit					Ιt	em 118	3		2.1 4.4	10, 2.11, 3.1 & i3
SYSTEM:		s	UΒ	SYSTEM	A:				CRI	TICALIT	Υ:	
Avionics		N	av	igatio	on, Guida	ince	& C	Cont.			4	
FUNCTIONAL DESCRIPTIO Attitude and Veloci	ty i	in su	рр	ort of	f the Nav	viga	tion	n and (Gui	dance e	equa	tions.
PHYSICAL DESCRIPTION:	16 i	inch	sp	-		g a	ppro	oximate	ely		ind s	!
TUG LOCATION:				ACCES	SIBILITY					LRU		
Forward Skirt			l	Adequ	ıate					Yes		
LIFE DATA												
OPERATION LIFE: SHELF LIFE: MTBF MTBR												
60,000 Hrs. 20 CYCLES Indefinite 10,000 Hrs. 10,000 Hrs.												
NO. TIMES REFURBISHAB	LE	-		ANTIC	PATED RE	FUR	3/100	FLIGH	ΓS	SPARES	SRE	QUIRED:
18					1.5					7	(BD	·
MAINTENANCE DATA								7				
	1	- 11	111	_		sc	HD_	UNSCH	미	RIMARY	TEC	CHNIQUE
MAINTENANCE LEVEL	х		X	TYPE	ITENANCE E	х		х		Condit	ion	- Monitoring
OFI REQUIREMENTS:												
Baseline self-test	сара	abili	.ty	adeqı	uate.							
MAINTENANCE FUNCTION	VS:											
MAINTENANCE FUNCTIONS: 1. SCHEDULED MAINTENANCE (LEVEL I) a. Review flight OFI data to determine if a failure or performance degradation has occurred. b. Perform system functional test and calibration. 2. UNSCHEDULED MAINTENANCE (LEVEL I) a. Remove and replace the unit if the OFI or test/calibration data indicates a failure or performance degradation, perform system functional test and calibration.												
3. UNSCHEDULED MAIN							i					
a. Repair as app	olic	able:	, t	est/c	alibrate	and	re	turn t	o s	corage	•	
OTHER CONSIDERATIONS	/REN	/ARK	S									
OTHER CONSIDERATIONS/REMARKS None												

,如果是不是一个,我们就是不是一个,我们就是不是一个,我们就是一个,我们也不是一个,我们也不是一个,我们也不是一个,我们也会会会会会会会会会会会会会会会会会会会 第一个

N. VINTENANCE ITEM DATA												
ITEM IDENTIFICATION:				TA	ABLE 5-1	REF:		NCTION NO.				
Rate Gyro					Item 11	9	2.3	10, 2.11, 3.1 & 43				
SYSTEM:	SUB	SYSTEM	1:			CRI	ITICALITY:					
Avionics			on, Guida					4				
FUNCTIONAL DESCRIPTION: Provi	ides	Tug	attitude	rate	inform	ati	on which	is a input to				
PHYSICAL DESCRIPTION: The rai approximately 9 pounds.	te g	yro oc	cupys ar	n enve	lope of	7 :	к 6 х 3 і	nches, weighing				
TUG LOCATION:	;	ACCESS	SIBILITY				LRU					
Forward Skirt		Adeq	quate				Yes					
LIFE DATA			,									
OPERATION LIFE: SHELF LIFE: MTBR MTBR MTBR												
3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs.												
NO. TIMES REFURBISHABLE		ANTICI	PATED REI	FURB/1	00 FLIGH	'TS	SPARES RE	QUIRED:				
18 2.5 TBD												
MAINTENANCE DATA				-	<u> </u>		O.M. A. T. C.	OLICIA DE				
MAINTENANCE	111	-1	TENANCE	SCHD	UNSCI	멛	PRIMARY TE	CHNIQUE				
LEVEL X	х	TYPE		Х	x		Condition	n - Monitoring				
OFI REQUIREMENTS:												
Same as item 118												
MAINTENANCE FUNCTIONS:					_ =	_						
Same as item 118												
								·				
OTHER CONSIDERATIONS/REMARK	KS	- · 					,,, , , , , ", ' , , ",					
None												

T													
MAINTENANCE ITEM DAT	A										,		
ITEM IDENTIFICATION:							TAE	SLE 5-1 F	REF:	:	FUN	NCTION NO. 10, 2.11,	
Accelerometer							Ite	em 120			4.		, J.I &
SYSTEM:			SUE	SYSTEN	1:		·		CRI	TICALIT	Υ:		
Avionics			Nav	rigatio	on, Guida	ance	& (Cont.			4		
FUNCTIONAL DESCRIPTION	N: P	rovi	des	Tuga	accelera	tion	rai	e info	0Ti 18	tion v	whic	ch is a i	nput to
the control equation	n.												
PHYSICAL DESCRIPTION:	T .	BS			· <u>·····</u>								
TUG LOCATION:				ACCES:	SIBILITY					LRU			
Forward Skirt Adequate Yes													
LIFE DATA													
OPERATION LIFE: SHELF LIFE: MTBF MTBR													
3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs.													Ire
NO. TIMES REFURBISHAB					PATED RE	FURE	3/100	L (L'es	rs l	SPARE	SRE	QUIRED:	11.0,
18						2.5						BD	
MAINTENANCE DATA						···-							
		11	111			SC	HD	UNSCH	D PI	RIMARY	/ TE	CHNIQUE	
MAINTENANCE LEVEL	x		x	MAIN	TENANCE	х		х	0	Condit	ion	- Monito	oring
OFI REQUIREMENTS:	Щ.	1 .	<u> </u>	 _		<u> </u>		<u> </u>				·····	
Same as item 118													
MAINTENANCE FUNCTION	VS:												
Same as item 118													
OTHER CONSIDERATIONS	/REN	иARК	ζS.										<u> </u>
None													
			-										

MAINTENANCE ITEM DATA													
ITEM IDENTIFICATION:						TAB	LE 5-1 F	REF:			CTION NO.		
Star Tracker						Ιt	tem 12	1.		2.10 4.43), 2.11, 3.1 &		
SYSTEM:		SUI	BSYSTEM	1:				CRI	TICALIT	Υ:			
Avionics		Na	vigatio	n, Guida	ance	& 0	Cont.		4				
FUNCTIONAL DESCRIPTION control reference in	Prov	ride cel	s attit estial	ude posi pointing	ition g mod	ı re	eferen	ce :	for man	ieuv	ers and attitude		
PHYSICAL DESCRIPTION: T ing approximately 12	he st	ar ound	tracker s.	соссируя	s an	env	velope	of	5" dia	met	er x 12", weigh-		
TUG LOCATION:			ACCESS	SIBILITY					LRU				
Forward Skirt		Adec	[uate					Ye	s				
LIFE DATA													
OPERATION LIFE: SHELF LIFE: MTBF MTBR 4,000 Hrs.													
3,400 Hrs. TIME	20	CYC	LES	Indefin	nite	· ·					6,720 Hrs.		
NO. TIMES REFURBISHABLE						JRB/100 FLIGHTS SPARES RE							
18	-			2.5	5					ТВ	บ		
MAINTENANCE DATA													
ļ	1 11		→		SCH	1D	UNSCH	D P	RIMARY	TEC	HNIQUE		
MAINTENANCE LEVEL	x	x		TENANCE	х		x		Conditi	.on	- Monitoring		
OFI REQUIREMENTS:			- I.		1								
Same as item 118													
MAINTENANCE FUNCTIONS	i:			·· · · · ·									
Same as item 118													
OTHER CONSIDERATIONS/F	REMAR	iks					.,						
None		_											

是一个人,我们也是一个人,我们也是一个人,我们也会是一个人,我们也会是一个人,我们也会是一个人,我们也会会会会会会会会会,我们也会会会会会会会会会会会会会会会会

MAINTENANCE ITEM DATA	A												
TABLE 5-1 REF: FUNCTION NO. 2.10, 2.11, 3.1													
Sun Sensor						I	tem 122	!		2. 4.			
SYSTEM:			SUB	SYSTEM	1:			CR	ITICALIT	Υ:			
Avionics		ا ا	Nav	rigatio	on, Guida	ance &	Cont.		4				
FUNCTIONAL DESCRIPTIO control reference i							refere	nce	for ma	aneı	ivers attitude		
	PHYSICAL DESCRIPTION: mt												
PHYSICAL DESCRIPTION: The sun sensor occupys an envelope of 6.9 x 6.5 x 3 inches, weighing approximately 4.66 pounds.													
TUG LOCATION: ACCESSIBILITY LRU							·····						
Forward Skirt				Adeo	luate				Yes	S			
LIFE DATA													
OPERATION LIFE: SHELF LIFE: MTBF 4,000 Hrs. 4,000 Hrs. TIME 20 CYCLES Indefinite (Design Coal) 6.720 Hrs.													
3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs													
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED:													
18					2.5	5				TBI)		
MAINTENANCE DATA		F	Luz	, <u> </u>		00:-	1	1-	TO IM A CO	,	COMMONE		
MAINTENANCE	!	1	111	_	ITENANCE	SCHD	UNSCI		-RIVIAH Y	115	CHNIQUE		
LEVEL	Х		Х	TYPE		х	Х		Condit	ion	- Monitoring		
OFI REQUIREMENTS.													
Same as item 118													
MAINTENANCE FUNCTION	NS:	,			T 10 T 1 100 100 100 100 100 100 100 100		<u>.</u>						
Same as item 118													
Same as Item IIO													
·													
OTHER CONSIDERATIONS	REN	MARK	(S						· · · · · · · · · · · · · · · · · · ·				
None													
							-, ···						

MAINTENANCE ITEM DATA												
ITEM IDENTIFICATION:						TAB	LE 5-1 F	REF:			NCTION NO. .0, 2.11, 3.1 &	
Electronics Control U	nit					Ιŧ	em 123	3	1	4.4		
SYSTEM:		SUB	SYSTEM	1:	,			CRI	TICALIT	Υ;		
Avionics		Nav	igatic	on, Guida	ance	& (Cont.			4		
FUNCTIONAL DESCRIPTION: various elements of th	1104										ace between the	
		-	-		_	_			_	_		
PHYSICAL DESCRIPTION: T inches, weighing appr					l un	it (occupy	s ar	enve	lope	e of 12 x 12 x 18	
TUG LOCATION:	<u>.</u>		ACCESS	SIBILITY					LRU			
Forward Skirt		_	Adequ	ıate	_				Yes			
LIFE DATA												
OPERATION LIFE: SHELF LIFE: MTBF 4,000 Hrs. 3.400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs.												
3,400 Hrs. TIME 20		CYC		(Desi	ign	Goal)		6,720 Hrs.				
NO, TIMES REFURBISHABLE ANTICIPATED REFURB/100 F IGHTS SPARES REQUIRED:												
18				2.5						TBD		
MAINTENANCE DATA		T	Т		T ==				2184 A C.	, ~	CHNIQUE	
MAINTENANCE	-	111	MAIN	TENANCE		<u>יי</u> ח						
LEVEL X	.	X	TYPE		X	_	X	_ ՙ	ondit	TOU	- Monitoring	
OFI REQUIREMENTS:	•											
Same as item 118												
MAINTENANCE FUNCTIONS:								_				
Same as item 118												
<u> </u>												
OTHER CONSIDERATIONS/RE	MARK	:S	· <u>···</u> • · · · · · · · · · · · · · · · · ·									
None												

MAINTENANCE ITEM DAT	Α														
ITEM IDENTIFICATION:							TA	3LE 5-1 F	REF		ı	NCTION NO.			
Laser Radar							I	tem 12:	5		4.4	10, 2.11, 43	3.1 &		
SYSTEM:			SUE	SYSTEN	1:				CRI	TICALIT	Υ:				
Avionics					ıs & Doci		_			3					
FUNCTIONAL DESCRIPTIO	N: P	rovi	de	attit	ude and	vel	oci	ty refe	ere	nces f	or (either au	tomatic		
or remote controlle	d r	ende	2VC	ous and	l docking	g op	era	tions.							
PHYSICAL DESCRIPTION:		7,-	TBS	5											
										(
TUG LOCATION:					SIBILITY					LRU					
Forward Skirt				Adeo	luate				_	Yes					
LIFE DATA															
OPERATION LIFE: SHELF LIFE: MTBF 4,000 Hrs. 3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs.															
NO. TIMES REFURBISHAB		<u>'</u>	JYU		l <u>Indefi</u> PATED REI							<u>l 6,720 H</u> QUIRED:	rs.		
18				ANTICI		. 5	7100	reioni	۵	JIANE	TBI				
MAINTENANCE DATA															
	1	11	[11]			SCI	HD	UNSCH	D P	PRIMARY TECHNIQUE					
MAINTENANCE LEVEL	x		х	MAIN	TENANCE	х		х		Condit	ion	- Monito	ring		
OFI REQUIREMENTS:	·	·				L		L				······································			
Same as item 118															
MAINTENANCE FUNCTION	IS:			<u> </u>	- <u></u>										
Comp. 22 - 110															
Same as item 118															
OTHER CONSIDERATIONS	/REM	IARK	S												
None															
<u></u>				·											

MAINTENANCE ITEM DATA													
ITEM IDENTIFICATION:		•		1	TAB	LE 5-1 R	REF:			ICTION NO.			
Laser Redar Electronics					ן	item 12	26		2.1 4.4	0, 2.11, 3.1 & 3			
SYSTEM:	SUB	SYSTEM	1:				CRI	TICALIT	Y:				
Avionics	<u>L</u> .		ıs & Docl						3				
FUNCTIONAL DESCRIPTION: Prov	ides	the p	orimary o	conti	-01	logic	and	inte	rfa	ce between the			
Laser Radar and the Digit	al C	ompute	er.										
PHYSICAL DESCRIPTION:	TBS												
TUG LOCATION: ACCESSIBILITY LRU Forward Skirt Adequate Yes													
LIFE DATA													
OPERATION LIFE: SHELF LIFE: MTBF 4,000 Hrs.													
3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs.													
NO. TIMES REFURBISHABLE		ANTICI	PATED RE	FURB.	/100	FLIGHT	S	SPARES	SRE	QUIRED:			
18			2.5	5				T	BD				
MAINTENANCE DATA				····									
1 11	111	<u> </u>		SCH	ID_	UNSCH	D PI	RIMARY	TEC	CHNIQUE			
MAINTENANCE LEVEL X	x	MAIN TYPE	TENANCE	Х		х	(Condit	ion	- Monitoring			
OFI REQUIREMENTS:		· · · · · · · · · · · · · · · · · · ·						<u>-</u>	·				
Same as item 118													
							·- <u>-</u>						
MAINTENANCE FUNCTIONS.													
Same as item 118													
İ													
İ													
OTHER CONSIDERATIONS/REMAR	KS												
None													
										·			

MAINTENANCE ITEM DATA													
TABLE 5-1 REF: FUNCTION NO. 2.10, 2.11, 3.1 & Digital Computer Item 128 4.43													
Digital Computer					Ite	em 128							
SYSTEM:	SUE	SYSTEM	1:				CRI	TICALIT	Y:				
Avionics	Dat	ta Mana	agement					3					
FUNCTIONAL DESCRIPTION: The	Dig:	ital Co	omputer p	prov	ide	s the r	orin	narv c	onti	ol over all			
Tug functions and activit of the various Tug subsys	iles.	, and :	in additi	ion 1	prov	vides i	For	self	tesi	capability			
PHYSICAL DESCRIPTION: The Di	eit:	al Com	nuter occ	CHEN	S 21	1 enve	lone	o o f 5	/i. s	- 1° 5 v 10 8			
inches, weighing approxim	PHYSICAL DESCRIPTION: The Digital Computer occupys an envelope of 5.4 x 10.5 x 19.8 inches, weighing approximately 65 pounds.												
TUG LOCATION:		ACCES	SIBILITY					LRU					
Forward Skirt		Adequ	uate					Yes					
LIFE DATA													
OPERATION LIFE: SHELF LIFE: MTBF MTBR													
3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs.													
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED:													
18 2.5 TBD													
MAINTENANCE DATA	·	<u></u>											
1 11	III			SCI	-ID	UNSCH	D P	RIMARY	Y TE	CHNIQUE			
MAINTENANCE LEVEL X	x		TENANCE	Х		х		Condit	ion	- Monitoring			
OFI REQUIREMENTS:						L							
Same as item 118													
								·					
MAINTENANCE FUNCTIONS:													
Same as item 118													
}													
OTHER CONSIDERATIONS/REMAR	KS								·				
None													

MAIN FENANCE ITEL! DAT	Α												
ITEM IDENTIFICATION:				···		TAB	LE 5-1 R	EF:			ICTION NO.		
Auxiliary Memory					_	!	It	em 129			2.1 4.4	0, 2.11, 3.1 & 3	
SYSTEM:			SUE	SYSTEM	1:				CRIT	TCALIT	Υ:		
Avionics			Dat	a Mana	agement					4			
FUNCTIONAL DESCRIPTIO	N: T	he A	ux:	lliary	Memory	unit	pro	ovides	an	exten	tior	of the main	
memory contained in also included in the	ı th	e Di	igi	tal Cor	nputer,	it i	S P	ossible	e th	at th	is n	memory could be	
	PHYSICAL DESCRIPTION: The Auxiliary Memory occupys an envelope of 9.6 x 8.1 x 5.8 inches, weighing approximately 20 pounds.												
TUG LOCATION:				ACCES	BIBILITY					LRU			
Forward Skirt Adequate Yes													
LIFE DATA CONTRACTOR LIFE MTRE MTRE													
OPERATION LIFE: SHELF LIFE: MTBF 4,000 Hrs.													
3,400 Hrs TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs.													
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED: 18 2.5 TBD													
MAINTENANCE DATA			1	 -		1		I <u>-</u>	т			V.II. O. I.E.	
AAA INITENIA NIGE		11	111	-4	TEALANGE	SC	HD	UNSCH	긱ᄣ	IWAHY	166	CHNIQUE	
MAINTENANCE LEVEL	х		x	TYPE	TENANCE	Х		х	C	ondit	ion	- Monitoring	
OFI REQUIREMENTS:				<u> </u>		L							
Same as item 118													
													
MAINTENANCE FUNCTION	1\$:												
Same as item 118													
					•								
]													
OTHER CONSIDERATIONS	/REN	MARK	s		<u>,</u>								
None													

MAINTENANCE ITEM DATA	A											
ITEM IDENTIFICATION:							TAB	LE 5-1 F	REF:			CTION NO.
Computer, Data & Or	bite	er I	nte	rface	Units		Ite	ems 13	0~13	32	2.1 4.4	.0, 2.11, 3.1 & 3
SYSTEM:			SUB	SYSTEM	l :				CRI	TICALIT	Υ:	
Avionics			Dat	a Mana	agement						4	
FUNCTIONAL DESCRIPTION Digital Computer an data conditioning f PHYSICAL DESCRIPTION:	d a: unct	ll o tion int	the s s erf	er subs such as ace us	systems of D/A and	on t	he '	Tug, a	s we	ell as	per	forming other
inches, weighing ap	pro	kima	tel	.y 5 po	ounds							
TUG LOCATION:				ACCESS	SIBILITY					LRU		
Forward Skirt & Inte	rtai	nk		Adeq	ıate					Yes		
LIFE DATA												
OPERATION LIFE: SHELF LIFE: MTBF 4,000 Hrs. 3.400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6.720 Hrs.												
3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs.												
NO. TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED: 18 2.5 TBD												duikes:
MAINTENANCE DATA										,		
WAINTENANCE DATA	ī	П	111	T		SC	HD	UNSCH	D PI	RIMARY	/ TEC	CHNIQUE
MAINTENANCE LEVEL	х		х	MAIN TYPE	TENANCE	Х		х		Condit	ion	- Monitoring
OFI REQUIREMENTS:	,			- 		1		1	<u> </u>			
Same as item 118												
MAINTENANCE FUNCTION	ış;					_						
Same as item 118												
			-									
OTHER CONSIDERATIONS	/REM	IARK	S									
None												

MAINTENANCE ITEM DATA											
ITEM IDENTIFICATION:				T.	ABLE	5-1 REF	:	1	CTION NO.		
Tape Recorder				I	[tem	133		2.1 4.4	0, 2.11, 3.1 & 3		
SYSTEM:	SUE	SYSTEM	1;			CRI	TICALIT	Υ:			
Avionics	Dat	ta Mana	agement					4	,		
FUNCTIONAL DESCRIPTION: Prodata.	vides	s perma	ment rec	ordin	ig ca	apabilt	y for	flig	ht OFI		
PHYSICAL DESCRIPTION: The to weighing approximately 13	ipe 1	recorde pounds.	er occupy	s an	eπve	elope o	£ 9.6	ж 7.	9 x 5.8 inches,		
TUG LOCATION:		ACCESS	BILITY				LRU				
Forward Skirt	Forward Skirt Adequate Yes										
LIFE DATA											
OPERATION LIFE. SHELF LIFE: MTBF 4,000 Hrs.											
3,400 Hrs. TIME 20	CYC	LES	Indefini	te	(1	Design			6,720 Hrs.		
NO. TIMES REFURBISHABLE		ANTICH							QUIRED:		
18	2.5 TBD										
MAINTENANCE DATA											
1 1	111	III SCHD UNSCHD PRIMARY TECHNIQUE									
MAINTENANCE LEVEL X	x		TENANCE	x		х	Condit	ion	- Monitoring		
OFI REQUIREMENTS:			···-			•					
Same as item 118											
MAINTENANCE FUNCTIONS:											
Same as item 118											
Ogme as reem 110											
OTHER CONSIDERATIONS/REMARKS											
None											

MAINTENANCE ITEM DATA	4												
ITEM IDENTIFICATION:							TAB	LE 5-1 I	REF:		l	ICTION NO.	
Buffer/Formatter							Ite	em 134			2.1 4.4	0, 2.11, 3.1 & 3	
SYSTEM:			SUE	SYSTEM	1;				CRI	TICALIT	Υ:		
Avionics			Dat	a Mana	agement						4		
FUNCTIONAL DESCRIPTION	N: P	rovi	de	data	conditi	onin	g f	rom th	e D	igital	Cor	nputer to the	
Tape Recorder and the to recording and tra	ie C	ommu	mic	cations	s subsys	tem,	th:	is inc	luđ	es pro	per	formatting prior	
PHYSICAL DESCRIPTION: inches, weighing ap	inches, weighing approximately 10 pounds.												
TUG LOCATION:				ACCES	SIBILITY					LRU			
Forward Skirt				Ađequ	ıate					Yes			
LIFE DATA													
OPERATION LIFE: SHELF LIFE: MTBF MTBR											MTBR		
3,400 Hrs. TIME 20 CYCLES Indefinit										Hrs.		6,720 Hrs.	
NO. TIMES REFURBISHAB				ANTICI								QUIRED:	
18					2	. 5					TBD		
MAINTENANCE DATA													
	_	=	Ш			sc	HD	UNSCH	D P	RIMARY	/ TEC	CHNIQUE	
MAINTENANCE LEVEL	х		х	MAIN TYPE	TENANCE	х		х		Condit	ion	- Monitoring	
OFIREQUIREMENTS: Same as item 118 MAINTENANCE FUNCTION Same as item 118	IS:												
OTHER CONSIDERATIONS/REMARKS None													

MAINTENANCE ITEM DATA	Δ.		••••	· · · · · · · · · · · · · · · · · · ·								
ITEM IDENTIFICATION:				• • • • • • • • • • • • • • • • • • • •	-		TAB	LE 5-1 RE	F:		ICTION NO.	
Airborne Electronic Phased Array (AESPA		y St	ee	rable 1	Microwave	e	I	tem 136		2.1 4.4	0, 2.11, 3.1 & 4	
SYSTEM:	· · · · ·		SUE	SYSTEM	1:			С	RITICALI	TY:		
Avionics			C	ommuni	cations				3			
FUNCTIONAL DESCRIPTIO system that combine Tug. This system in	s t	he f	un	ctions	of trans	smitt	ing	g and re	eceiving	to	and from the	
PHYSICAL DESCRIPTION:		Т	BS									
TUG LOCATION:				ACCESS	SIBILITY				LRU			
Forward Skirt				Adequ	ıate		_		Yes			
LIFE DATA												
OPERATION LIFE: SHELF LIFE: MTBF 4,000 Hrs. 3,400 Hrs. TIME 20 CYCLES Indefinite (Design Goal) 6,720 Hrs.											MTBR	
	O, TIMES REFURBISHABLE ANTICIPATED REFUR										OUIRED:	
18					2.5				i	TBD		
MAINTENANCE DATA												
	1	-11	111			SCF	ID .	UNSCHD	PRIMARY	/ TEC	CHNIQUE	
MAINTENANCE LEVEL	Х		X		TENANCE	Х		х	Condit	ion	- Monitoring	
OFIREQUIREMENTS: Same as item 118												
MAINTENANCE FUNCTION Same as item 118	IS:											
OTHER CONSIDERATIONS	REM	IARK	s			·	,					
None	OTHER CONSIDERATIONS/REMARKS None											

MAINTENANCE ITEM DATA			······································								
ITEM IDENTIFICATION:				Т	ABL	E 5-1 R	REF:			CTION NO.	
Command Decoder				ב	Ĺteπ	137			4.4	10, 2.11, 3.1 &	
SYSTEM:	SUE	SYSTEM	1:				CRI	TICALIT	Y:		
Avionics	Co	mmunic	ations					3	3		
FUNCTIONAL DESCRIPTION: Programmends prior to uter input/output units	rides o tra	s the p	orimary i to the o	nter i	Eace Tug	and subs	sig syst	gnal co cems or	ondi th	tioning of e Digital comp-	
PHYSICAL DESCRIPTION: TBS											
TUG LOCATION:		ACCESS	SIBILITY					LRU			
Forward Skirt		Adeo	quate					Yes			
LIFE DATA											
OPERATION LIFE:		E:	1	ИТВF 4.00	00 H	irs.		MTBR			
3,400 Hrs. TIME 20	,400 Hrs. TIME 20 CYCLES Indefinit							Goal)		6,720 Hrs.	
NO. TIMES REFURBISHABLE 18	FURB/1 .5	100 F	LIGHT	rs :	SPARES	TBD	QUIRED:				
MAINTENANCE DATA		!			**						
I II III SCHD UNSCHD PRIMARY TECHNIQUE											
MAINTENANCE LEVEL X	K	MAIN TYPE	ITENANCE	x		х		Condit	ion	- Monitoring	
a. Review flight OFI				if a	fa:	ilure	or	perfo	 cmar	nce degradation	
 SCHEDULED MAINTENANCE (LEVEL I) a. Review flight OFI data to determine if a failure or performance degradation has occurred. b. Perform system functional test and calibration. UNSCHEDULED MAINTENANCE (LEVEL I) a. Remove and replace the failed unit if the OFI or Test/Calibration data indicates a failure or performance degradation, perform system functional test and calibration. UNSCHEDULED MAINTENANCE (LEVEL II) a. Repair as applicable, test/calibrate and return to storage. 											
OTHER CONSIDERATIONS/REMA	RKS	·	<u> </u>					·			
None											

MAINTENANCE ITEM DATA											
ITEM IDENTIFICATION:			TA	BLE 5-1 REI	F:	FUNCTION NO.					
Television Camera			I	tem 139	i	2.10, 2.11, 3.1 4.22	&.				
SYSTEM:	SUBSYSTEM	:	-, L	Cf	RITICALIT	Υ:					
Avionics	Communica	tions			4						
FUNCTIONAL DESCRIPTION: Provi system in the event of a 1	aser rada	ckup rem r system	ote co failu	ntrolled re.	rendzv	ous and docking					
PHYSICAL DESCRIPTION: TB.	S										
TUG LOCATION:	ACCESS	IBILITY	-		LRU						
Forward Skirt	Adeq	uate			Yes						
LIFE DATA											
OPERATION LIFE: SHELF LIFE: MTBF 4,000 Hrs.											
	YCLES	ite	(Design		6,720 Hrs.						
NO. TIMES REFURBISHABLE 18	ANTICIP	URB/100 2.5	FLIGHTS	SPARE	S REQUIRED: TBD	_					
MAINTENANCE DATA											
MAINTENANCE I II	111	CENIANICE	SCHD	UNSCHD	PRIMARY	TECHNIQUE					
LEVEL X X	TYPE	TENANCE	X	х	Condit	ion - Monitoring					
OFI REQUIREMENTS:				<u></u>							
Same as item 118											
MAINTENANCE FUNCTIONS:	<u></u>	<u></u>		····							
Same as item 137											
							i				
OTHER CONSIDERATIONS REMARKS	S										
None											
				<u></u>	,,						

MAINTENANCE ITEM DAT	A										
ITEM IDENTIFICATION:		- -					TAE	BLE 5-1 R	EF:	FUI	ICTION NO.
Television Electro	nics	ş					I	tem 14	0		10, 2.11, 3.1 & 22
SYSTEM:			SUB	SYSTEM	1:	<u></u>		` ` ` `	CRITICAL	TY:	<u>رون بين بيني بيني بيني بيني بيني بيني بين</u>
Avionics			Co	mmunic	ations			ĺ			4
FUNCTIONAL DESCRIPTION	N: 1	rov	ide	s cont	rol and	proc	ess	ing ci	rcuits f	or t	he television
camera.											
PHYSICAL DESCRIPTION:	TI	 3S				,			······································		
TUG LOCATION:			-7	ACCESS	SIBILITY				LRU		
Forward Skirt		•		Adeq	uatre				Ye	S	
LIFE DATA											
OPERATION LIFE: SHELF LIFE: MTBF 4,000 Hrs.											
3,400 Hrs. TIME	CYC	LES	ite			o nis. gr Goal)		6,720 Hrs.			
NO. TIMES REFURBISHAB		ANTIC	FURB.		FLIGHT			QUIRED:			
18 2.5 TBD											
MAINTENANCE DATA											
		11	111			SCF	1D	UNSCH	PRIMAR	Y TE	CHNIQUE
MAINTENANCE LEVEL	х	х		MAIN TYPE	TENANCE	х		X	Condi	tion	- Monitoring
OFI REQUIREMENTS:											
Same as item 118											•
MAINTENANCE FUNCTION	VS:										
Same as item 137											
OTHER CONSIDERATIONS	/BEN	JARI	CS.				_			_	
None											
1											

MAINTENANCE ITEM DATA											
ITEM IDENTIFICATION:					TAB	LE 5-1 R	EF:	1	CTION NO.		
Signal Conditioner					It	em 142		2.1 4.2	0, 2.11, 3.1 & 1		
SYSTEM:	SUB:	SYSTEM	1:				CRI	TICALITY:			
Avionics	M	easure	ement					4			
FUNCTIONAL DESCRIPTION: Processes low level sign	nals	from	measurin	ng se	ensc	ors bef	ore	e entry in	to the DIV		
PHYSICAL DESCRIPTION:											
TBS											
TUG LOCATION:		ACCESS	SIBILITY					LRU			
Fwd Skirt/In' rtank/ Aft Skirt		· · · · · · · · · · · · · · · · · · ·	Ad	≘quat	e			Yes	:		
LIFE DATA											
OPERATION LIFE:	PERATION LIFE: MTBF MTBR N/A - no										
Indefinite TIME 20	CYCL	_ES	Indefin:	ite		TB	BD		repairable		
NO. TIMES REFURBISHABLE		ANTICI	PATED REI	FURB.	/100	FLIGHT	S	SPARES REC	QUIRED:		
N/A			N/A					l Ship	Set		
MAINTENANCE DATA	ICE DATA										
1 11	111			SC⊦	ID .	UNSCHE	PI	RIMARY TEC	HNIQUE		
MAINTENANCE LEVEL x		MAIN TYPE	TENANCE	x		ж	(Condition-	monitoring		
OFI REQUIREMENTS:		<u> </u>					ш.				
	equa	te									
MAINTENANCE FUNCTIONS: 1. Scheduled maintenance (Level I) a. Review OFI data (onboard tapes or ground telemetry data) and correlate with ground instrumentation checkout data for indication of failure or degradation. 2. Unscheduled maintenance (Level I) a. Remove and replace											
OTHER CONSIDERATIONS REMAR	KS										
None											

MAINTENANCE ITEM DATA										
ITEM IDENTIFICATION:						3LE 5-1 RE			NCTION NO.	
Measurement Sensors						Items 14 thru 151	-		10, 2.11, 3. 21	.1 &
SYSTEM:	SUBSYS	STEM:				C	RITICALI	ITY:		
Avionics	Measu	ıreme	nt						4	
FUNCTIONAL DESCRIPTION:) D3.4	e٦		 ۱ <u>۱ میر</u>			
Provide temperature, pres vibration and strain meas				w.E.I.J	T T(owrate,	AOTERS	,c, 1	rdara Tenel	•
PHYSICAL DESCRIPTION:										
TBS		_						<u> </u>	-	
TUG LOCATION:	AC	CCESS	IBILITY				LRU			
A11	1	Ade	quate			_		Ye:	s	
LIFE DATA	l				_					
OPERATION LIFE:		1	SHELF LIF	FE:		MTBF			MTBR Policy	7
Indefinite TIME 20	ite	!	TBD)		N/A - non repairable				
NO. TIMES REFURBISHABLE	CYCLES AN				1/100	FLIGHTS	SPAR	ES RE	QUIRED:	
N/A			N/A				1 S	Ship se se	Set each	
MAINTENANCE DATA							<u></u>	_ 20		
1 11	111	-		SCI	HD	UNSCHD	PRIMAF	RY TE	CHNIQUE	
MAINTENANCE x	1 1 1	MAINT TYPE	TENANCE		x	ж	Condi	.tion	-monitoring	
OFI REQUIREMENTS:				·				 -		
Baseline defined OFI ad	equate	Э.								
	-									
MAINTENANCE FUNCTIONS:		_		·						
1. Scheduled maintenance				-		4 × 1		٠١	" ⊹ ام	
a. Review OPI data with ground inst	(onbos	ard t tatio	apes on	gro	und deb	celemet	cry dat	.a) a	mu correlati f failure or	e r
degradation.	r anicili	-act	Liicuki	- u L	- ه	1	a	U	<u></u>	=
2. Unscheduled maintena		Leve1	. I)							
a. Remove and repla	ce.									
				-			-			
OTHER CONSIDERATIONS/REMARK	KS						• mi-	- <i>-</i> -		-
None										
1010										
					_					

MAINTENANCE ITEM DATA						-						
ITEM IDENTIFICATION:					BLE 5-1 I			ICTION NO.				
Detectors					ems 15 ru 156	_	4.	10, 2.11, 3.1 & 21				
SYSTEM:	SUBSY	STEN	1:			CRIT	ICALITY:					
Avionics		Ŋ	leasuremer	nt		•	4					
FUNCTIONAL DESCRIPTION: Provide H ₂ /0 ₂ leak detec	tion,	cont	amination	n dete	ction,	and	gas anal	lysis.				
PHYSICAL DESCRIPTION:												
TBS				_								
TUG LOCATION:	AC	CESS	SIBILITY				LRU					
A11	Yes											
LIFE DATA												
OPERATION LIFE: MTBF MTBR												
Indefinite TIME 20 CYCLES None TBD TBD												
NO. TIMES REFURBISHABLE	1 Ship Set each											
TBD TBD type detector												
MAINTENANCE DATA												
MAINTENANCE 1 11	SCHD UNSCHD PRIMARY TECHNIQUE											
LEVEL		ГҮРЕ	TENANCE	ж	ж		On-Condit	tion				
OFI REQUIREMENTS:	-!				.							
n/A												
N/A												
MAINTENANCE FUNCTIONS: 1. Scheduled maintenanc a. Ground system ch b. Recalibration as 2. Unscheduled maintena a. Remove and repla b. Return to vendor 3. Unscheduled maintena a. Vendor/depot rep	eckout requi nce (L ce /depot nce (L	of red evel for evel	detector I) repair III)		tion a	nd p	roper cal	libration.				
OTHER CONSIDERATIONS/REMARI	KS							2				
None												

MAINTENANCE ITEM DATA	A										
ITEM IDENTIFICATION						TAE	3LE 5-1 R	EF:	FUI	NCTION NO.	
Fuel Cell							Item 15	88		LO, 2.11, 2.19, L & 4.39	
SYSTEM:			SYSTER					CRITICAL	ITY:		
Avionics			ectric stribu	al Power tion	and				4		
FUNCTIONAL DESCRIPTION	N:										
Provides electrica	ıl pow	er g	enerat	ion							
PHYSICAL DESCRIPTION:									· · · <u> </u>		
12" x 16" x 20", 1	25/56	pour	ıds								
TUG LOCATION:			ACCES	SIBILITY				LRU			
Intertank			A	dequate					Ye	S	
LIFE DATA											
OPERATION LIFE:				SHELF LIF	FE:		MTBF			MTBR	
TBD TIME T	BD	CYC	LES	TI	BD		TH	BD		TBD	
NO. TIMES REFURBISHABI	LE		ANTICI	PATED REF	FURB.	/100	FLIGHT	S SPAF	RES RE	QUIRED:	
TBD TBD 1 Ship Set											
MAINTENANCE DATA											
1 11 SCHD UNSCHD PRIMARY TECHNIQUE											
MAINTENANCE LEVEL	х	x	MAIN	TENANCE	3		ж	Condi	tion	-monitoring	
OFI REQUIREMENTS: Baseline define MAINTENANCE FUNCTION 1. Scheduled main a. Review OFI b. Replace sp	S: tenano data	ee (I	evel indica	ation of				peration	nal d	egradation.	
2. Unscheduled ma a. Remove and b. Return to 3. Unscheduled ma a. Vendor rep	intena repla vendon intena	ance ace r for ance	(Levē: repa: (Leve:	l I) ir l III)		, 					
OTHER CONSIDERATIONS	REMAF	RKS		•							
None											

MAINTENANCE ITEM DATA										
ITEM IDENTIFICATION:					TAB	LE 5-1 RI	F:	FUNCTION NO.		
Battery					7	Item 15	9	1.7, 2.10, 3.1, 4.39 & 5.7		
SYSTEM:	SUE	SYSTEM	1:			(RITICALIT	ΓY:		
Avionics	E	ectrica stribut	al Power tion	and			4			
FUNCTIONAL DESCRIPTION: Supplements current rec PHYSICAL DESCRIPTION:	uire	nents :	for motor	102	ads	and po	wers the	fuel cells.		
9" x 8" x 8", 20 pounds	I									
TUG LOCATION:		ACCES	SIBILITY				LRU			
Intertank		Adequ	uate					Yes		
LIFE DATA										
OPERATION LIFE: SHELF LIFE: MTBF MTBR										
TBD TIME TBD	CYC	LES	T	BD T			TBD	TBD		
NO. TIMES REFURBISHABLE	ES REFURBISHABLE ANTICIPATED R							S REQUIRED:		
TBD TBD 1 Ship Set										
MAINTENANCE DATA										
l			TENIANGE	SCF	1D	UNSCHD	PRIMARY 	/ TECHNIQUE		
MAINTENANCE LEVEL x		TYPE	TENANCE	ж		ж	Conditi	on-monitoring		
OFIREQUIREMENTS: Baseline defined OFI ad	lequa	te								
MAINTENANCE FUNCTIONS: 1. Scheduled maintenar a. Review OFI data b. Replace electro 2. Unscheduled mainter a. Remove and repl	for lyticance	indic: media (Leve)	ation of a as requ l I)	ire	i.		gradatio	n.		
OTHER CONSIDERATIONS REMA	RKS									
None										

MAINTENANCE ITEM DATA	-										
ITEM IDENTIFICATION:		TABLE	5-1 REF:	FL	INCTION NO.						
Reactant Tanks		Item	160		.14, 2.10, 2.19, .1 & 4.39						
SYSTEM: SU	BSYSTEM:		CRIT	TICALITY:							
I AVIODICS	ectrical Power a stribution	and		3							
FUNCTIONAL DESCRIPTION:				· · · · · ·							
Provides storage capability	for LO ₂ and LH ₂	supply of	f react	ants for	the fuel cells.						
PHYSICAL DESCRIPTION:			•								
TBS											
TUG LOCATION:	ACCESSIBILITY	•••		LRU							
Intertank	TBS			Y	es						
LIFE DATA											
OPERATION LIFE:	SHELF LIF		rBF	_	MTBR						
3,400 hrs TIME 20 CY	CLES Indefini		,000 hr: esign go		6,720 hrs						
NO. TIMES REFURBISHABLE	ANTICIPATED REF	URB/100 FL	IGHTS	SPARES R	EQUIRED:						
18 2.5 1 Ship Set											
MAINTENANCE DATA											
I II III SCHD UNSCHD PRIMARY TECHNIQUE											
MAINTENANCE x	MAINTENANCE TYPE	ж	x Co	ondition	- Monitoring						
OFI REQUIREMENTS:				· · · · · ·							
Baseline define OFI adequat	e										
MAINTENANCE FUNCTIONS:	1 T\										
1. Scheduled Maintenance (L a. Review flight OFI da		of overla	oad or l	stress c	onditions.						
b. Visual inspection fo											
2. Unscheduled Maintenance		_			}						
a. Remove and replace d	amaged/failed u	nit.									
					•						
OTHER CONSIDERATIONS/REMARKS											
None											

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MAINTENANCE ITEM DATA													
ITEM IDENTIFICATION:			TABLE 5-1 REF:				FUNCTION NO.						
Power Processi				Item 161			2.10, 2.11, 3.1 & 4.39						
SYSTEM: SU				BSYSTEM! lectrical Power and			CRI			ITICALITY:			
				stribution				4					
FUNCTIONAL DESCRIPTION: Provides power regulation at input to power bus													
TIOATGG bower regererou or Tuber to hower one													
PHYSICAL DESCRIPTION:													
The PPU occupies an envelope of 9 x 9 x 5 inches, weighing approximately 8 pounds													
TUG LOCATION:	ACCESSIBILITY	ITY L					LRU						
Intertank						Adequate					Yes		
LIFE DATA													
OPERATION LIFE: MTBF 4,000 hrs									MTBR				
3,400 hrs TIME	3,400 hrs TIME 20 CYCLE					~~ ke a a a							
NO, TIMES REFURBISHABLE ANTICIPATED REFURB/100 FLIGHTS SPARES REQUIRED:									!				
18 2.5 TB									TBD				
MAINTENANCE DATA		·					·	- T <u>-</u>					
MAINTENIANCE	_'_	11	111	→ l	SC	HD	UNSCH	믜『	PRIMARY TECHNIQUE				
MAINTENANCE LEVEL	ж	ж		MAINTENANCE TYPE	31	к ж Conditio			Condi	tion	n-Monitoring		
OFI REQUIREMENTS:													
Same as item 118													
MAINTENANCE FUNCTION	NS:												
Same as îtem 137													
-													
OTHER CONSIDERATIONS/REMARKS													
None													
L													

NAS8-31011 8-74 (PRELIMINARY)

MAINTENANCE ITEM DATA											
ITEM IDENTIFICATION:				TAE	LE 5-1 R	EF:	FUNCTION NO.				
Power Distributors		Items 162-1			66 2.1 4.3	lO, 2.11, 3.1 & 39					
SYSTEM: SUBSYSTEM: Electrical Powe						<u> </u>	CRI	TICALITY:			
Avionics					4						
FUNCTIONAL DESCRIPTION: Provides selective switching, control and conditioning of											
power from main power bus to various Tug subsystems.											
PHYSICAL DESCRIPTION:											
TBS											
TUG LOCATION:					LRU	RU					
Fwd Skirt and Intertank	Adequate						Yes				
LIFE DATA OPERATION LIFE: MTBF MTBR											
			4,000 hr				6,720 hrs				
	CYC	LES Indefinite				(Desi			<u> </u>		
NO, TIMES REFURBISHABLE	ANTICI	ANTICIPATED REFURB/100 FLIGHT				S	SPARES REQUIRED:				
18		<u>5</u>				TBD					
MAINTENANCE DATA	1 111	1		SCI	ın	UNSCH	Jos		CHNIONE		
MAINTENANCE ''	1 '''		NTENANCE		ND OIVSCHD			PRIMARY TECHNIQUE			
LEVEL x x		TYPE				ж	-Monitoring				
OFI REQUIREMENTS:											
Same as item 118											
MAINTENANCE FUNCTIONS:			<u> </u>								
Same as item 137											
									:		
									:		
OTHER CONSIDERATIONS REMARKS											
None											
NACO 25D11 9 74 /PRELIMINARY											